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YUKON PLACER MINING INDUSTRY
1989 - 1990

JIM ROBB
1990

Canada

93-01308/

YUKON
PLACER MINING
INDUSTRY 1989-1990

Compiled by L. P. van Kalsbeek

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This publication benefited from the efforts of the Placer Mining Inspectors A. E. Rothwell, J. B. Leary, M. R. Johnson, R. E. Leckie, S. J. Howes and L. P. van Kalsbeek who conducted the mine site visits and gathered the data for the Placer Mine Inspection Reports.

Placer Mining Section
Mineral Resources Directorate
Northern Affairs Program
Yukon Region
Indian and Northern Affairs Canada
Whitehorse, Yukon

On the cover: Special thanks to Jim Robb for the contribution of his Art for our cover. Jim's unique and impressive style captures the true flavour of Yukon history.

Livingstone Creek Mining Recorder's Office was established at the height of the Yukon Gold Rush (1898-1900). It was reported by "old timers" that Livingstone Creek produced over $1,000,000 in gold.

(From the private collection of M. Fuerstner)

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Please write to:

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This publication is dedicated to all
placer miners past and present.

"Sometimes I fancy it has been a dream,
the Great White Silence, the lure of the
gold spell, the delirium of the struggle;
a dream,..."

Robert W. Service from "The Trail of '98"

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PREFACE

This report documents the state of the Placer Mining Industry in the Yukon Territory for the 1989 and 1990 mining seasons. This report differs from the preceding volume "Yukon Placer Mining and Exploration 1985 to 1988" in that it does not contain summaries of Placer Exploration Programs filed with the Northern Affairs Program for assessment credit. The individual map sheets of the national topographic system that were printed in the previous volumes of this series, are not included in this volume. Each property detailed in this report is referenced to the 1:50,000 scale map of the national topographic system in which it is located.

The majority of this volume consists of detailed descriptions of placer operations visited by the staff of the Placer Mining Section of the Mineral Development Division, Northern Affairs Program, Yukon Region. Also included is information that may be useful to readers who are interested in searching for and developing placer properties in the Yukon Territory.

We invite comments from the readers of this report on the material presented herein and also suggestions for inclusion of any other material in future publications in this series that may be of use to the Placer Mining fraternity to whom this publication is directed.

We thank the many miners who donated time from their busy schedules to describe their mines and their mining methods to our staff. We recognize this input and sincerely appreciate it, as without it this publication would not be possible.

David A. Latoski
Head, Placer Mining Section
Chief, Claims Inspector
Northern Affairs Program

APERÇU DES ACTIVITÉS DE L'INDUSTRIE MINIERE (PLACERS) DU YUKON AU COURS DES ANNÉES 1989 ET 1990

Par D.A. Latoski, chef, Section des placers, AINC

Introduction

Malgré une conjoncture économique peu favorable, l'industrie yukonnaise des placers vient de connaître deux années de prospérité. Les chiffres de 1989, qui indiquent un volume record de minerai brut récupéré, ont même dépassé les records enregistrés en 1988. En effet, les 165 571 onces de minerai brut récupérés en 1989 représentent un record de production depuis 1917, année ou l'on récupéra, avec treize dragues et de vastes installations d'abattage hydraulique des graviers de White Channel, 218 913 onces de minerai brut. Étant donné la stabilité du cours de l'or en 1989 et en 1990, on attribue principalement à la hausse des taux d'intérêts de 1990 la baisse de production de 20% accusée au cours de cette année. Il n'en demeure pas moins que le rendement des placers pour l'année 1990 a été appréciable quoiqu'il ait chuté a 132 658 onces de minerai brut.

Activités d'établissement de concessions

Traditionnellement, le volume des activités d'établissement de concessions de placers témoigne de la santé de l'industrie des placers au Yukon. Or, l'histoire démontre que le volume d'activités est étroitement lié au cours de l'or. Les années 1989 et 1990 n'échappent pas à la règle. En 1990, le volume des activités d'établissement de concessions de placers a frôlé le niveau le plus bas depuis les dix dernières années (figure 1).

Bien qu'ayant enregistré une augmentation d'environ 26% par rapport à l'année 1989, les activités d'établissement de concessions de placers continuent de décliner, suivant en cela la chute progressive des cours de l'or. Ce déclin se reflète également sur le volume des activités d'établissement de concessions locatives de placers (figure 2). Bien que n'ayant pas enregistré une baisse aussi dramatique que les concessions non locatives, les concessions locatives sont en régression depuis quelques années.

Or si le volume des activités d'établissement est à la baisse, le nombre de concessions en règle a augmenté en 1989 et en 1990, atteignant son niveau le plus élevé depuis dix ans (figure 3). En effet, le nombre de concessions en règle était de 17 915 à la date du 31 décembre 1990, comparativement au record historique des quelque 18 000 concessions en règle enregistrées en 1898, à l'époque de la Ruée vers l'or. En 1990, le nombre de concessions locatives de placers en 1990 est passé a 345, des 385 qu'il était en 1989 (figure 4). La baisse du nombre de concessions locatives en règle peut avoir contribué quelque peu à l'augmentation du nombre de concessions non locatives en règle par rapport à l'année 1989. Dans l'ensemble, on a enregistré en 1990 une légère augmentation de la superficie totale de placers par rapport à l'année 1989 (figure 5).

Exprimé en milles, la superficie cumulative totale des concessions locatives et non locatives était de 2 713 milles et de 2 750 milles en 1989 et en 1990 respectivement. Bien que le volume des activités d'établissement de concessions soit à la baisse, on estime que l'industrie des placers du Yukon dans son ensemble, si l'on en juge par le nombre d'établissements en règle, est en bonne santé.

Production des placers aurifères en 1989 et en 1990

La production des placers aurifères continue d'être un des principaux moteurs de l'économie du secteur primaire du Yukon. En 1989, cette industrie a atteint une production de 165 571 onces de minerai brut (figure 6)- battant tous les records des soixante-douze dernières années - soit, compte tenu d'un ratio moyen de 800, un rendement de 132 457 onces d'or pur représentant une valeur de plus de 57,6 millions de dollars canadiens. Bien qu'en baisse de 20% par rapport à l'année 1989, la production aurifère de 1990 a atteint un total de 132 658 onces de minerai brut ou 106 126 onces d'or pur. La production de l'année 1990 figure donc au quatrième rang du classement des soixante-douze dernières années. Le cumul des années 1989 et 1990 correspond à celui de la production aurifère des quatre premières années de la précédente décennie (figure 7).

La valeur totale cumulative de la production aurifère pour les années 1989 et 1990 a dépassé la marque des 104 millions de dollars. Les schémas ci-dessous représentent les rendements obtenus en 1989 et en 1990 dans les vingt-cinq criques les plus productives du Yukon.

L'année 1989 a enregistré le plus grand nombre de placers en exploitation depuis 1983, avec 226 exploitations en tout, depuis les activités de découverte et de préparation de l'extraction jusqu'aux activités de préconcentration (sluice) et de production d'or. Ces activités ont fourni quelque 750 emplois directs. Et même si en 1983 le nombre d'exploitations actives était de 241 avec un total de 769 emplois directs, le volume d'or produit fut de 43% inférieur à celui de 1989. Toutefois, en 1990 le nombre d'exploitations actives est passé à 194 et le nombre d'emplois fournis à 700.

Cours de l'or

En 1989 et en 1990, le cours de l'or s'est caractérisé par sa stabilité (figure 8). En 1989, le cours de l'or a varié entre 410 $ US l'once, soit 476 $ Can (compte tenu d'un taux de change de 0,860) en décembre, et 362 $ US l'once, soit 428 $ Can (compte tenu d'un taux de change de 0,846). La moyenne mensuelle du cours de l'or pour l'ensemble de l'année 1989 fut de 381 $ US l'once, soit 451 $ Can (compte tenu d'un taux de change de 0,845).

Les chiffres de l'année 1990 sont sensiblement les mêmes que ceux de 1989. En 1990, le cours de l'or a varié entre 417 $ US l'once, soit 499,99 $ Can (compte tenu d'un taux de change de 0,836), en février, et 352 $ US l'once, soit 414 $ Can (compte tenu d'un taux de change de 0,952) en juin. La moyenne mensuelle du cours de l'or pour l'ensemble de l'année 1990 fut de 383 $ US l'once, soit 451 $ Can (compte tenu d'un taux de change de 0,857).

AN OVERVIEW OF THE YUKON PLACER MINING INDUSTRY 1989 AND 1990

By D. A. Latoski, Head, Placer Mining Section, I.N.A.C.

Claim and Gold Production Statistics compiled by L. van Kalsbeek and W.P. LeBarge

Introduction

Though less than ideal economic conditions prevailed in 1989 and in 1990, Yukon's placer mining industry continued to flourish. Production figures in 1989 identified a record number of crude ounces recovered surpassing 1988's modern day record. The 1989 total of 165,571 crude ounces is the largest amount of placer gold recovered since 1917 when thirteen dredges and large scale hydraulic mining of the white channel gravels produced 218,913 crude ounces. With gold prices in 1989 and 1990 remaining constant, 1990's high interest rates may have been the dominant contributing factor to the 20% drop in the production level. Production in 1990 was respectable, though it dropped to 132,658 crude ounces.

Staking Activity

Throughout the long history of placer mining in Yukon claim staking activity has been indicative of the health of the industry. As history has shown, the level of activity is influenced by the price of gold with 1989 and 1990 being no exception. Placer claim staking in 1990 was near its lowest level in the past decade as illustrated in **(Figure 1)**.

**YUKON PLACER CLAIMS
STAKED 1980-1990**

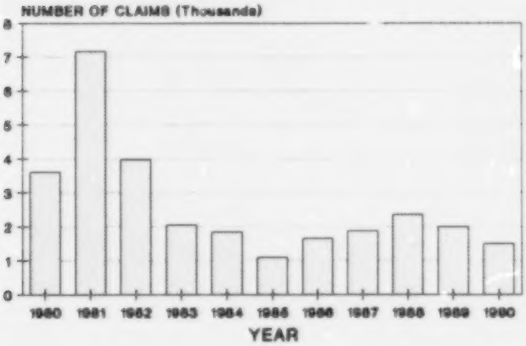

Figure 1

Though approximately 26% higher in 1989 than in 1990, claim staking activity is on the wane, just as the price of gold has been steadily dropping in the last few years. This decline in claim staking activity is also reflected in the level of placer lease staking activity as illustrated in **(Figure 2)**. Though not reaching ten year lows as is the case with claim staking, lease staking has been slowly declining in the last few years.

**YUKON PLACER LEASES
STAKED 1980-1990**

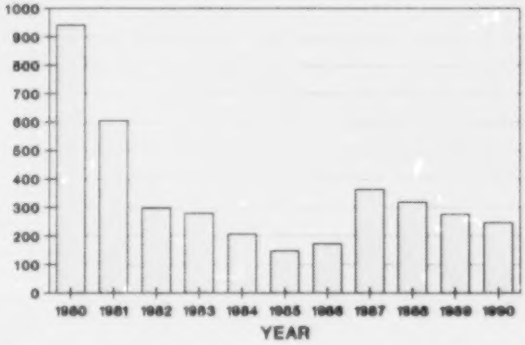

Figure 2

Though claim staking activity is down, the number of claims held in good standing in 1989 and 1990 is up and is at the highest level of the past ten years **(Figure 3)**. The 1990 figure of 17,915 claims in good standing as of December 31st, 1990, compares with the historic figure of some 18,000 placer claims in good standing at the height of the Klondike Gold Rush of 1898.

**YUKON PLACER CLAIMS
IN GOOD STANDING 1980-1990**

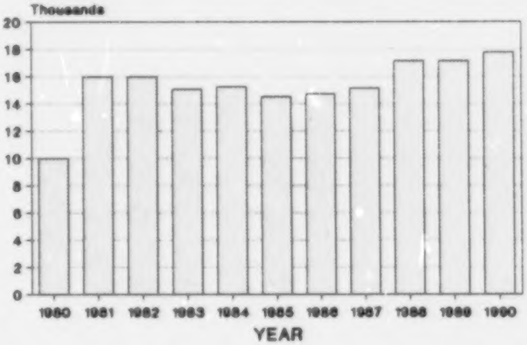

Figure 3

The number of placer leases in 1990 fell slightly to 345 from the 1989 figure of 385 **(Figure 4)**.

YUKON PLACER LEASES IN GOOD STANDING 1980-1990

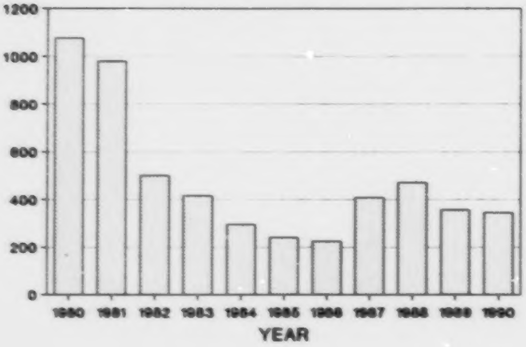

Figure 4

This drop in the number of leases in good standing may have contributed somewhat to the increase of the number of claims in good standing in 1990 over 1989. Together, the accumulated amount of placer ground held increased slightly in 1990 from 1989 **(Figure 5)**.

MILES OF YUKON PLACER GROUND HELD IN GOOD STANDING 1980-1990

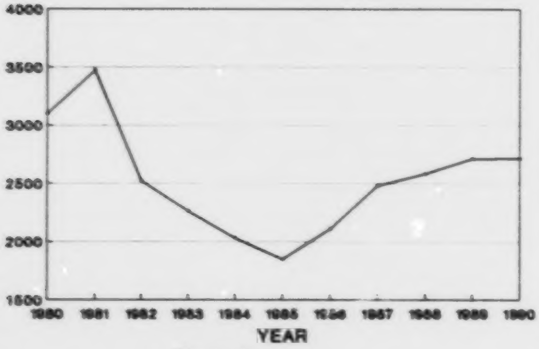

Figure 5

Measured in miles, the combined total of leases and claims equated to 2,713 miles and 2,750 miles in 1989 and 1990 respectively. Although staking activity is down, the overall health of the Yukon's placer mining industry, as reflected by the number of placer claims held in good standing, is sound.

Placer Gold Production in 1989 and 1990

Yukon's placer gold production continues to make a significant economic contribution to the Yukon's resource based economy. In 1989 the industry produced a 72 year record high of 165,571 crude ounces **(Figure 6)** or based on an average grade of 800 fine, 132,457 fine ounces of gold valued at over 57.6 million dollars Canadian.

YUKON PLACER GOLD PRODUCTION CRUDE OUNCES 1910 - 1990

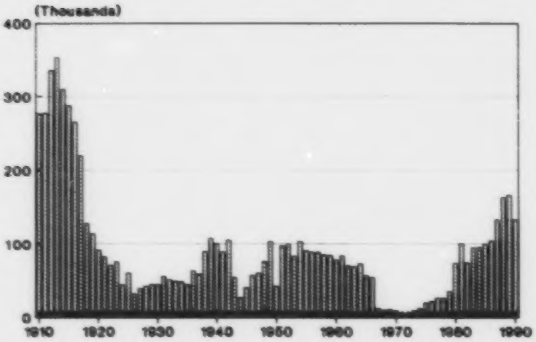

Figure 6

Though down 20% from 1989, gold produced in 1990 reached a total of 132,658 crude ounces or 106,126 fine ounces, ranked as the fourth best year over the last 72 years. The cumulative amount for 1989 and 1990 is approximately as much as the total gold produced in the first four years of the 1980's **(Figure 7)**.

YUKON PLACER GOLD PRODUCTION CRUDE OUNCES 1980-1990

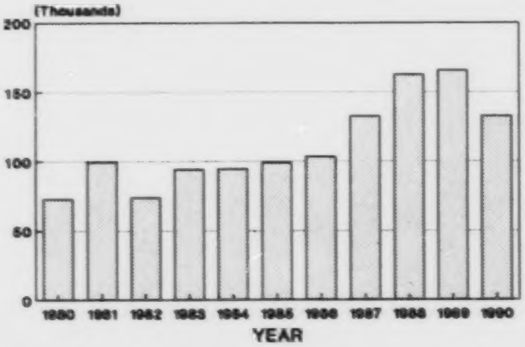

Figure 7

The total combined dollar value of the gold produced in 1989 and 1990 surpassed the 104 million dollar mark. The following tables show the twenty-five most productive creeks in 1989 and 1990.

MOST PRODUCTIVE CREEKS 1989

1. Dominion	25,627
2. Indian River	20,865
3. Hunker	17,046
4. Sixtymile	12,710
5. Scroggie\Mariposa	7,036
6. Clear	6,725
7. Swamp	6,153
8. Goldrun	5,464
9. Bonanza	5,368
10. Maisy May	3,991
11. Sulphur	3,983
12. Miller	3,921
13. Highet	3,460
14. Glacier	3,039
15. Blackhills	2,843
16. Thistle	2,794
17.Klondike	2,207
18.Eldorado	2,175
19.Eureka	2,104
20.Allgold	1,565
21.Haggart	1,513
22.Henderson	1,385
23.Bedrock	1,320
24.Duncan	1,003
25.Upper Bonanza	923

MOST PRODUCTIVE CREEKS 1990

1. Indian River	19,086
2. Dominion	19,017
3. Hunker	11,311
4. Goldrun	10,172
5. Clear	9,372
6. Quartz	6,366
7. Scroggie\Mariposa	6,121
8. Sixtymile	6,003
9. Highet (Mayo)	3,498
10. Swamp (Moosehorn)	3,051
11. Thistle	2,840
12. Bonanza	2,827
13. Miller	2,790
14. Black Hills	2,695
15. Klondike	2,525
16. Sulphur	2,481
17. Glacier	2,226
18. Duncan	2,148
19. Henderson	1,768
20. Allgold	1,495
21. Dublin Gulch	1,454
22. Rude	1,259
23. Bedrock	1,149
24. Ballarat	1,025
25. Gold Bottom	987

In 1989 there were more active placer mining operations than in any year since 1983. There were 226 operations either stripping ground, preparing for mining, and/or actually sluicing gravels and producing gold. These operations employed some 750 people directly. Even though there were 241 active operations in 1983 employing some 769 people directly, 43% less gold was produced than in 1989. In 1990 though, the number of active operations dropped to 194 and the number of workers was less than 700 people.

Gold Price

Gold prices through 1989 and 1990 remained stable **(Figure 8)**. In 1989 gold prices ranged from a high of $410.00 U.S. per ounce or $476.00 Canadian (Canadian-U.S. dollar exchange rate of 0.860) in December to a low of $362.00 U.S. per ounce or $428.00 Canadian (Canadian-U.S. dollar exchange rate of 0.846) the overall monthly average gold price for 1989 was $381.00 U.S. per ounce or $451.00 Canadian (Canadian-U.S. dollar exchange rate of 0.845).

AVERAGE MONTHLY GOLD PRICES 1989-1990
LONDON MARKET - US DOLLARS

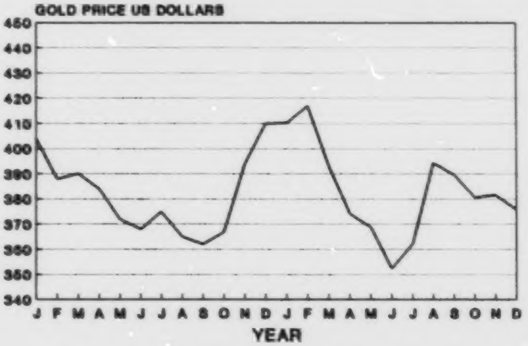

Figure 8

The 1990 figures did not vary greatly from the 1989 figures. In 1990 gold prices range from a high of $417.00 U.S. per ounce or $499.99 Canadian (Canadian-U.S. dollar exchange rate of 0.836) in February to a low of $352.00 U.S. per ounce or $414.00 Canadian (Canadian-U.S. dollar exchanges rate of 0.952) in June. The 1990 monthly average was $383.00 U.S. per ounce or $451.00 Canadian (Canadian-U.S. dollar exchange rate of 0.857).

PLACER GOLD PRODUCED FROM YUKON CREEKS, 1985 - 1990 (compiled by L.P. van Kalsbeek)
Crude Ounces (and W.P. LeBarge)

STREAM or RIVER	TRIBUTARY to	85	86	87	88	89	90	1989-90
Dawson Mining District								
Aligold	Klondike	69	0	151	635	1565	1495	3060
Ballarat	Yukon	1077	163	472	483	448	1025	1473
Barker	Stewart	22	80	1182	0	3	38	41
Barlow	Clear	0	103	0	0	13	118	131
Bear	Klondike	73	1384	647	435	244	594	838
Bedrock	Sixtymile	232	403	101	0	1320	1149	2469
Big Gold	Sixtymile	952	0	0	0	32	0	32
Black Hills	Stewart	3829	4830	6857	3767	2843	2695	5538
Bonanza	Klondike	8567	10120	15284	9824	5368	2827	8195
Clear	Stewart	3680	3646	4834	4290	6725	9372	16097
Dominion	Indian	11151	8616	13360	16190	25627	19017	44644
Eldorado	Bonanza	3369	3356	2914	3790	2175	429	2604
Eureka	Indian	3416	2355	2982	3623	2104	901	3005
Fortymile	Yukon	195	153	159	324	179	273	452
Glacier	Sixtymile	48	223	884	1336	3039	2226	5265
Gold Bottom	Hunker	0	0	0	0	1179	987	2166
Gold Run	Dominion	1127	1129	7288	8520	5464	10172	15636
Henderson	Stewart	2762	857	854	1624	1385	1768	3153
Hobo	Klondike	54	0	0	0	0	0	0
Hunker	Klondike	12020	12910	8355	17423	17046	11311	28357
Indian	Yukon	2143	9835	15774	30482	20865	19086	39951
Kirkman	Yukon	61	91	128	81	46	310	356
Klondike	Yukon	213	95	157	393	2207	2525	4732
Little Gold	Sixtymile	693	0	0	364	57	0	57
Maisy May	Stewart	2386	2852	5542	4063	3991	543	4534
Matson	Sixtymile	50	88	0	0	244	31	275
Miller	Sixtymile	2916	2517	5069	6026	3921	2790	6711
Moose	Fortymile	0	0	0	0	0	0	0
Poker	Fortymile	101	0	0	0	0	0	0
Quartz	Indian	3249	2441	1024	384	732	6366	7098
Scroggie/Mariposa	Stewart	2172	3918	6895	8394	7036	6121	13157
Sestak	Yukon	0	0	0	40	539	399	938
Sheep	Firth	207	0	0	0	0	0	0
Sixtymile	Yukon	5239	8014	11676	10160	12710	6003	18713
Sulphur	Dominion	9520	8372	3868	4662	3983	2481	6464
Tenmile	Sixtymile	3567	3363	3399	3477	0	0	0
Thistle	Yukon	0	0	162	0	2794	2840	5634
Upper Bonanza	Bonanza	0	0	0	0	923	256	1179
Various Dawson Creeks		0	3	5	0	7043	1310	8353
Total Dawson		85160	91917	120023	140790	143850	117458	261308
Mayo Mining District								
Anderson	Mayo Lake	0	13	0	0	0	0	0
Bear	Moose/Stewart	0	0	80	132	231	209	440
Carlson	Minto	0	0	0	0	0	0	0
Davidson	Mayo River	0	0	0	0	90	112	202
Dawn	Mayo Lake	0	0	0	0	0	0	0
Dublin Gulch	Haggart	0	0	0	0	1361	1454	2815
Duncan	Mayo River	1323	798	238	727	1003	2148	3151
Empire	No Gold	450	119	174	223	0	0	0
Gem	Sprague	124	101	14	64	0	0	0
Haggart	McQuesten	3552	3345	1542	1661	1513	124	1637
Highet	Minto	2192	1735	2233	3042	3460	3498	6958
Johnson	McQuesten	0	0	411	470	668	782	1450
Ledge	Mayo Lake	6	48	99	153	194	219	413
Lightning	Duncan	590	673	437	331	438	641	1079
McQuesten	Stewart	0	0	0	0	0	0	0
Minto	Mayo River	0	0	0	247	85	0	85
Morrison	Seattle	0	0	0	16	0	0	0
Russell	Macmillan	0	0	0	277	0	0	0
Seattle	McQuesten	0	0	0	0	0	0	0
Steep	Mayo Lake	0	76	0	0	0	0	0
Stewart	Yukon	0	0	0	0	0	0	0
Swede	Haggart	0	0	258	3230	61	0	61
Vancouver	McQuesten	0	0	0	371	184	0	184
Various Mayo Creeks		0	0	0	0	1551	0	1551
Total Mayo District		8237	6908	5486	10944	10839	9187	20026

STREAM or RIVER	TRIBUTARY to	85	86	87	88	89	90	1989-90
Whitehorse Mining District								
Arch	Donjek	34	0	0	0	0	0	0
Back	Victoria	206	4	82	173	122	54	176
Burwash	Kluane	4	53	18	39	0	28	28
Canadian	Britannia	386	0	0	0	0	0	0
Casino	Dip	0	0	0	0	0	0	0
Cottoneva	South Big Salmon	0	0	0	0	56	0	56
Dollis	Tatshenshini	0	0	0	0	132	0	132
Fourth of July	Jarvis	174	462	948	1076	861	4	865
Guder	Seymour	0	35	47	0	126	0	126
Happy	Big	0	0	0	0	0	0	0
Hayes tributaries	Selwyn	19	0	30	105	0	34	34
Kate	Ladue	0	0	0	42	0	522	522
Kenyon	Scottie	2595	2120	4313	0	0	0	0
Kimberly	Jarvis	0	0	32	5	11	53	64
Klaza tributaries	Nisling	70	251	166	107	69	210	279
Lake	South Big Salmon	11	0	18	0	31	14	45
Little Violet	South Big Salmon	16	35	0	18	0	34	34
Livingstone	South Big Salmon	143	545	417	507	312	195	507
Martin	South Big Salmon	0	34	13	0	0	0	0
Mechanic	Big	55	30	0	57	0	0	0
Mendocina	South Big Salmon	0	0	8	0	0	12	12
Moose	Lubbock/Atlin	0	0	0	0	0	0	0
Nansen	Nisling	17	29	162	737	45	0	45
Porcupine	Donjek	0	0	0	0	0	0	0
Printers	Cultus	2	0	0	0	0	0	0
Quill	Kluane	0	0	6	0	0	0	0
Reed	Donjek	339	317	127	85	29	20	49
Revenue	Big	1229	540	105	623	28	273	301
Rude	Dip	0	0	397	1039	798	1259	2057
Seymour	Big	101	207	[illegible]	347	0	43	43
South Big Salmon	Big Salmon	0	0	0	0	0	0	0
Squirrel	Duke	166	8	0	0	0	21	21
Summit	South Big Salmon	0	0	16	0	0	0	0
Swamp	Scottie	0	0	0	5583	6153	3054	9207
Swede Johnson	Kluane	0	11	54	0	0	0	0
Victoria	Nisling	0	79	0	215	436	0	436
Wheaton	Lake Bennett	0	0	0	0	0	0	0
Various Whitehorse Creeks		0	0	0	0	1673	160	1833
Total Whitehorse		5567	4760	7269	10758	10882	5990	16872
Watson Lake Mining District								
Liard River		0	10	13	0	0	0	0
Various Watson Lake Creeks		0	0	0	0	0	23	23
Total Watson Lake		0	10	13	0	0	23	23
Summary of Placer Gold Production								
Dawson Mining District		85160	91917	120023	140790	143850	117458	261308
Mayo Mining District		8237	6908	5486	10944	10839	9187	20026
Whitehorse Mining District		5567	4760	7269	10758	10882	5990	16872
Watson Lake Mining District		0	10	13	0	0	23	23
Total		98964	103595	132791	162492	165571	132658	298229

MINERAL RESOURCES DIRECTORATE, NORTHERN AFFAIRS PROGRAM

Mineral Development Division

Present staff includes A. R. Waroway (Regional Manager -Mineral Development), D. A. Latoski (Head, Placer Mining Section/Chief Claims Inspector), L. P. van Kalsbeek (Placer Mining Inspector - Whitehorse), S. J. Howes (Placer Mining Inspector - Whitehorse), A. E. Rothwell (Placer Mining Inspector - Dawson), J. B. Leary (Placer Mining Inspector - Dawson), R. E. Leckie (Placer Mining Inspector - Mayo). V. R. Bailie (Office Administrator) and E. A. Sembsmoen (Office Clerk). Placer mining inspectors conduct claim inspections under the authority of the Yukon Quartz Mining Act, the Yukon Placer Mining Act, the Territorial Dredging Regulations and the Territorial Coal Regulations. They also complete field inspection reports for each mine visited, and assistance is provided to miners regarding road access or mining problems. The Placer Mining Inspection Unit is the agency responsible for inspection and enforcement of effluent discharge standards set forth in the Yukon Fisheries Protection Authorization as well as fish habitat and conservation and restoration measures.

Mineral Rights Division

Present structure consists of a regional office and four district mining records' offices (Watson Lake, Whitehorse, Mayo and Dawson), which administer over 60,000 individual dispositions made under federal legislation, namely the Yukon Quartz Mining Act (1924), the Yukon Placer Mining Act (1906), and the Territorial Coal Regulations and Territorial Dredging Regulations made under the (federal) Territorial Lands Act.

Present staff consists of Roland Ronaghan (Regional Manager), R.H. Whittingham (Whitehorse Mining Recorder), M. Dejean (Dawson City Mining Recorder), P. McLeod (Watson Lake Mining Recorder), Yolanda Burkhard (Acting Mayo Mining Recorder), and ten full time support staff.

Exploration and Geological Services Division

The Exploration and Geological Services Division of Northern Affairs consists of a Regional Manager, five geologists, an office manager, and a Map Sales Manager. Present staff includes S.R. Morison (Regional Manager/Chief Geologist), J.G. Abbott (Minerals Geologist), T.J. Bremner (Mineral Deposits Geologist), W.P. LeBarge (Staff Geologist), D.J. Ouellette (Staff Geologist), A.Wagner (Office Manager), and E. Phillips (Map Sales Manager). The Division maintains an outlet of the Canada Map Office and sells topographic, geological (surficial and bedrock), aeromagnetic, aeronautical and land use maps. Recent Geological Survey of Canada publications including geochemical surveys are also available for purchase. Other services available to industry personnel include a geological library of texts and journals, a lab equipped with petrographic microscopes, and a lab with rock cutting, staining, and core splitting facilities. Geology Division staff are available for consultation by arrangement at their office at 200 Range Road, Whitehorse, Yukon,(403) 667-3204.

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YUKON PLACER MINING 1989 - 1990

INTRODUCTION

This volume is a compilation of two sources of data, placer mining inspection reports and placer publications by government and industry sources. The Placer Mining Inspection Unit of the Northern Affairs Program, Indian and Northern Affairs Canada was the principal agency involved in the gathering and compilation of data for this publication. Mining inspection reports were compiled from site visits conducted by the staff of the Placer Mining Inspection Unit from 1989 to 1990. Information provided regarding claims, leases and royalties collected was provided by Mineral Rights, Division of the Mineral Development Branch of the Northern Affairs Program.

EXPLANATORY NOTES

Many of the placer mining operations which were active during the period of 1989 to 1990 may have been visited only once or twice; there are also operations which were not documented at all during this time. Some miners may find their particular operation has not been included this is due to incomplete or missing data. Submission of relevant information is invited for inclusion in subsequent industry activity reports. The narrative descriptions were written by the placer mining inspectors and were not edited by the miners.

The descriptive reports in this volume have been alphanumerically arranged by NTS (National Topographic System) 1:250 000 scale map divisions. The mining inspection reports include the creek name, the operator, the water licence number (when available), and the year of the inspection. Locations of each operation are given in latitude and longtitude, as well as by the 1:50,000 scale NTS map division. Each operation has been assigned the NTS map number number on which it is located.

Since most placer miners do not commonly use the metric system British units of measure have been used. A conversion table is provided.

THE HISTORY OF REGULATIONS AND REGULATORY ISSUES FACING THE YUKON PLACER MINING INDUSTRY

PRESENTATION TO THE R.M.S. ROSS PLACER MINING CONFERENCE
Richmond, B.C. - March 15-17, 1990

David A. Latoski

First of all I would like to briefly outline the structure of government and the regulatory framework of the placer mining industry in the Yukon Territory, past and present.

In Canada, the Yukon Territory is a unique area where the federal government has a dual responsibility - that of the federal government, as well as that of a quasi-provincial government.

In fulfilment of this provincial mandate, the Department of Indian Affairs and Northern Development, DIAND, is regulating the mining industry, developing legislation, collecting royalties and issuing mining grants, leases and licences.

Specifically, DIAND administers the Yukon Placer Mining Act, YPMA, which regulates the placer industry by granting mineral rights on land administered by the Crown, and the collection of royalties for gold exported from the Territory. The Yukon Placer Mining Act, was promulgated in 1906 and had provisions for water rights for claim holders, but these sections of the YPMA were repealed when Parliament passed the Northern Inland Waters Act, NIWA, in 1972.

DIAND is also responsible for the administration of the Northern Inland Waters Act. The Northern Inland Waters Act was promulgated to govern the use of inland waters in northern Canada. The Act was not enacted specifically as an environmental control, but rather as resource management legislation. Therefore, the benefits of the use of water must be considered along with any environmental impact. The Act provides for the establishment of the Yukon Territory Water Board. The Board consists of not more than nine members, and not less than three members, including the chair, appointed by the Minister of Indian Affairs and Northern Development. "The membership of each Board shall include at least one nominee of each of the departments of the government of Canada that, in the opinion of the Governor in Council, are most directly concerned with the management of the water resources of the Yukon Territory". This is the exact wording from the Northern Inland Waters Act. It is important to note that Board members, including the Chair, both past and present, have been or currently are placer mining and are directly concerned with the management of the water resource.

The specific mandate of the Water Board is to provide for the conservation, development and utilization of water resources essentially achieved through its licensing authority. However, the Minister of Indian Affairs and Northern Development must approve and sign the licence before it comes into effect. This means that while the Water Board is concerned with issuing water-use licences it is the responsibility of DIAND to ensure compliance with these licences as well as ensure compliance with the Northern Inland Waters Act.

The licence, once issued, basically allows the licensee to use the amount of water required to carry out an effective placer mining operation, deposit a waste within a certain effluent standard, and stabilize the stream bed progressively as they mine and permanently once mining has been completed.

Therefore, to operate a placer mine in the Yukon, a person or persons basically would require a valid placer mining claim or claims or authority to mine on claims, and a water use licence. Though operating in compliance with the authority received from the Yukon Territory Water Board, pursuant to the Northern Inland Waters Act, the operator may be contravening another federal Act, the Fisheries Act, in which case the more stringent Act would prevail.

Within the federal mandate of the federal government is responsible for the preservation of the fisheries resource. This is accomplished through provisions in the Fisheries Act. There is a section in the Fisheries Act that deals with the prohibition of any undertaking that would result in the harmful alteration, disruption or destruction of fish habitat. This is administered by the Department of Fisheries and Oceans, DFO. There is also a section in the Fisheries Act that prohibits the deposit, in water, of any substance deleterious to fish, i.e. sediment. This is administered by the Department of the Environment, DOE.

This contradictory situation of overlapping authority had proven to be unacceptable. The industry, while complying with the government's requirements of obtaining the necessary permits to placer mine, was unable to obtain the most important requirement, and that was "legal certainty". Both government and industry recognized that a permanent solution must be found to replace this stand off.

The federal government, in recognizing the significant contribution that placer mining has made, and will continue to make to the well being of the Yukon's economy, attempted to find a balance between the industry and the government's responsibility for sound resource management practices. This process began in 1982 with DFO, in co-operation with DOE and DIAND, drafting a set of proposed guidelines to govern the placer mining industry.

A public review process followed in 1983, and the results were summarized in a committee's report titled The Christianson Report. However, the guidelines and recommendations were not adopted by the Minister of Indian Affairs and Northern Development. In March of 1986, the DIAND Minister of the day requested the Yukon Territory Water Board to review and advise him on the water licence regulations applying to placer mining. The Chair of the Water Board was asked to set up a task force on placer mining. The task force, chaired by Tim Koepke, was instructed to review all existing data and discuss the regulation of water use with industry, government and other interest groups throughout the Territory and report to the Water Board by June 1, 1986. In turn, the Chair of the Water Board was asked to provide recommendations to the DIAND Minister by June 30, 1986.

By the time 1986 was coming to an end, the Department of Indian Affairs and Northern Development had a new Minister. This was in fact the third person to assume the role of Minister since this process had begun. It was obvious that the federal government was committed to resolve the gold vs. fish resource conflict.

In December of 1986, the new Minister of DIAND released the Northern Mineral Policy. Generally, this policy stated the federal government's commitment to mineral development in the north and specifically ensuring legal certainty for placer miners in the Yukon Territory. The political will and initiative was in place and the recommendations of the task force of 1986 were adopted and implemented into what we have today in the Yukon Territory regulating the placer industry.

The three main components of the new regulatory regime were:
1) creation of the Yukon Placer Implementation Review Committee;
2) the Yukon Fisheries Protection Authorization, and
3) the establishment of the Placer Mining Inspection Unit within the Mineral Development Section of DIAND in Whitehorse.

The Yukon Placer Implementation Review Committee, IRC for short, is comprised of five members: one representative from the placer mining industry and one representative from each of the agencies involved - DFO, YTG and DIAND, and one chairperson, mutually agreed to by all parties involved.

Under its terms of reference, the IRC's first task was to review the Authorization and policy directive, which were drafted by DFO, DOE and DIAND. The Yukon Fisheries Protection Authorization establishes the schedule of allowable discharges in concentration of settleable solids that may be discharged into streams.

The policy directive of the Yukon Fisheries Protection Authorization also has a provision in it that if a placer miner finds it impossible to meet the discharge standards set out in the Authorization, or has other site-specific needs, they may apply for a site-specific authorization, SSA. This SSA is applied for through the Yukon Territory Water Board to the IRC for review and then submitted with the Committee's recommendations to the Minister of Fisheries and Oceans for consideration and approval.

The second task was to recommend the initial classification of all Yukon placer mining streams. The stream classification rationale is based on the sensitivity of these streams to water quality and fish habitat disruptions.

The Authorization and the policy directive were announced in March, 1988, by the Ministers of DIAND and DFO and came into effect June 1, 1988. This major accomplishment was the result of intense negotiations between DIAND, DFO DOE, the Government of Yukon and the Klondike Placer Miners Association. Together, the Authorization and policy directive provide the legal certainty the placer mining industry in the Yukon has long sought.

The establishment of the Placer Mining Inspection Unit within the Mineral Development Section of DIAND was done to provide a "one window" approach to industry regulation. While the industry is inspected and regulated by the Placer Unit, water use applications remain with the Yukon Territory Water Board.

The IRC is required by its terms of reference to monitor the application of the Authorization and the policy directive, and to make recommendations to the Ministers of DIAND and DFO for further refinement of the documents prior to the 1992 placer mining season. These recommendations must take into account the effects of placer mining sediment on significant fish populations and the implications of compliance for the industry. This is being accomplished by a two phase study, funded jointly by industry and government.

Through this whole process, a strong sense of co-operation has developed between the placer industry and the various government departments, both federal and territorial. This co-operation has made possible the accomplishments to date and has resulted in a much greater respect and understanding of each parties' interests and responsibilities, and recognition that there are three significant resources being managed for the benefit of the Yukon and Canada - gold, fish and water.

Industry and government sitting down together to consider each others interests, is a process that is unique in today's world. Decisions are not made by voting, but through discussion that considers the needs of all parties concerned. Decision by consensus is why this process has proven to be successful in the Yukon.

ENVIRONMENTAL ASSESSMENT REVIEW PROCESS (EARP)

What is EARP?

The Environmental Assessment Review Process, or EARP, is a process for reviewing and assessing the environmental and socio-economic impacts of project proposals. Earp is a federal law, deriving its authority from the EARP Guidelines Order.

What Activities are Subject to EARP Review?

EARP applies to any proposal for an activity:
* that takes place on lands, including the off-shore, which are administered by the Government of Canada
* that may have an environmental effect on an area of federal responsibility
* for which the Government of Canada makes a financial contribution
* that is undertaken by a federal government department.

All federal departments may be required to initiate screening of project proposals involving an area of the department's responsibility. In the Yukon Territory, the Department of Indian Affairs and Northern Development (DIAND) is the federal department responsible for initiating screening on the majority of project proposals taking place on federal Crown land.

What is Required under EARP in the Yukon?

EARP requires that before irrevocable decisions are made in the planning process, departments must "ensure that the environmental implications of all proposals...are fully considered".

This means that before a land use or timber permit, lease or water license can be granted screening of impacts must take place.

The EARP Guidelines Order requires that projects be reviewed to consider "the potential environmental effects of the proposal and the social effects directly related to those environmental effects" and to also consider "the concerns of the public regarding the proposal and its potential environmental effects".

How are Project Proposals Screened?

DIAND screens project proposals by internal review and outside referral.

First, DIAND staff assess supplied information to determine whether there is sufficient information to determine areas of potential impact.

Depending upon its potential impacts, the project proposal is then referred to a variety of agencies to identify concerns and interests. Referral agencies include other federal government departments, territorial government departments, Indian Bands, non-government agencies, the proponent, associations and interest groups.

What is the Result of the Review?

An assessment is made of the **significance** and **acceptability** of environmental impact that would result from the project proposal.

If the potentially adverse environmental impacts that may be caused by the proposal are **insignificant or mitigable with known technology,** the proposal may proceed or proceed with mitigation. Mitigation reduces or eliminates environmental and associated socio-economic impact.

If the potentially adverse environmental effects that may be caused by the proposal are **significant** the Guidelines Order calls for the proposal to be referred to the Minister of the Environment for public review by an EARP Panel.

If the potentially adverse environmental effects of the proposal are **unknown**, the proposal may be given further study, be rescreened and reassessed, or be referred to the Minister of the Environment for public review by an EARP Panel.

If the potentially adverse environmental effects that may be caused by a proposal are **unacceptable**, the proposal may either be modified and rescreened, or reassessed, or be abandoned.

What is an EARP Panel?

An EARP Panel is an independent board of experts appointed by the Minister of the Environment to direct extensive review of a project proposal. Its members are selected for their freedom from conflicting interests and for their special knowledge of the proposal under review. In the past, panels have been established to review major projects, such as Beaufort Sea hydrocarbon development and Shakwak Highway Project.

How are Mitigation Measures Enforced?

The EARP Guidelines Order requires that when "mitigation and compensation measures could prevent any of the potentially adverse environmental effects of a proposal from becoming significant", steps must be taken to "ensure that such measures are implemented". This could be accomplished by terms and conditions of permits or licences.

However, before licenses or permits are issued, the decision-making authority must be satisfied that the requirements of the EARP Guidelines Order are met.

Is this a New Requirement?

No. However, two recent decisions of the Federal Court of Canada have given new interpretations to the authority of the EARP Guidelines Order. These interpretations established the Guidelines Order as law which applies to all federal departments and must be applied in making decisions.

As a result, DIAND is reviewing all of its statutory responsibilities to determine what steps must be taken to meet the requirements of EARP.

DIAND is also reviewing present processes, such as water licensing, to provide comprehensive review processes which do not overlap.

Copies of the EARP Guidelines Order are available from DIAND offices thorughout the Yukon.

CONVERSION FACTORS

1 cubic yard = 0.764 cubic metres
1 long ton = 2240 lbs
1 short ton = 2000 lbs
1 tonne = 1.102 short tons
1 tonne = 2204.62 lbs
1 troy ounce = 31.1035 grams
1 troy ounce = 20 pennyweights
1 troy ounce = 480 grains
1 pennyweight = 24 grains
1 grain = 0.06479 grams
1 ounce/cubic yard = 40.68 grams/cubic metre
1 ounce/ton = 34.2848 grams/tonne

GRAIN SIZE

Particles	**Average diameter in mm**
Boulders	greater than 256 mm
Cobbles	64 mm to 256 mm
Pebbles	4 mm to 64 mm
Gravel	greater than 2 mm
Sand	2 mm to 1/16 mm
Silt	1/16 mm to 1/256 mm
Clay	less than 1/256 mm

Note: 1 inch = 25.4 millimetres (mm)

VOLUME

10 Milliliters (ML) = 1 Centiliter (C)
10 Centiliters = 1 Deciliter (DL) =100 Milliliters
10 Deciliters = 1 Liter (L) = 1,000 Milliliters
10 Liters = 1 Dekaliter (DAL)
10 Dekaliters = 1 Hectoliter (HL) = 100 Liters
10 Hectoliters = 1 Kiloliter (KL) = 1,000 Liters

Liter x 0.21998 = Gallon (British)
Liter x 0.26417 = Gallon (U.S.)
Gallon x 4.5459 (British, Canadian) = Liters
Gallon (U.S.) x 3.785 = Liters

TEMPERATURE

°C = (°F - 32) x 555

°F = (°C x 18) + 32

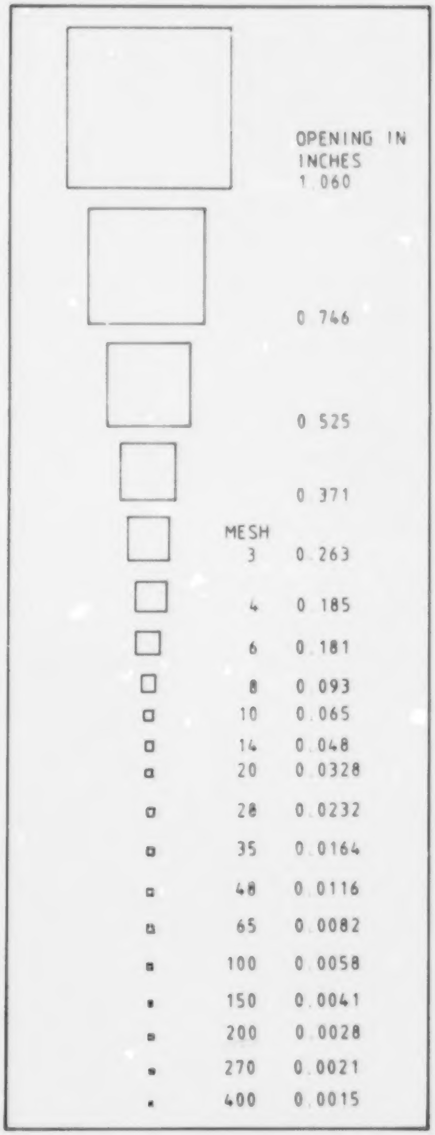
The following measures are not to be held as absolute values but are used by many miners in making working estimates:

1 standard gold pan = 16" diameter top, 10" diameter bottom, 2.5" depth, holds 0.007 cubic yards, or 0.005 cubic metres, and weighs approximately 21 lbs (ordinary gravel)
1 cubic yard = approximately 143 standard gold pans
Weight of ordinary gravel in place = 2500 to 3000 lbs/cubic yard
Specific gravity of ordinary gravel in place = 1.48 to 1.78 g/cm^3
1 ounce gold/ton ordinary gravel = 1.25 to 1.50 ounces/cubic yard
1 gram gold/tonne ordinary gravel = 1.48 to 1.78 grams/cubic metre
Swelling factor of ordinary gravels = 20 to 30% increase in volume

TYLER STANDARD SCREEN SCALE

Relationship of openings in basic $\sqrt{2:1}$ screen scale series.

(Openings not to scale).


OPENING IN INCHES
1.060
0.746
0.525
0.371
MESH
3 0.263
4 0.185
6 0.181
8 0.093
10 0.065
14 0.048
20 0.0328
28 0.0232
35 0.0164
48 0.0116
65 0.0082
100 0.0058
150 0.0041
200 0.0028
270 0.0021
400 0.0015

BASELINE SURVEYS OF YUKON PLACER CREEKS

Stream	Tributary to	Date	Surveyor	Plan	Microplan
Adams Creek	Bonanza Creek	1901	McPherson	12066	2796
Agate Creek	Barker Creek	1901	Gibbon	34670	3899-902
Alberta Creek	Walhalla Creek	1912	Kitto	34676	2476
Allgold Creek	Klondike River	1902	Gibbon	9824	2809
Allgold Creek	Flat Creek	1983	Thomson	68972	10243
American Gulch	Bonanza Creek	1901	McPherson	12069	2795
Back Creek	Nisling River	1912	Dickson	20050	2001
Barker Creek	Stewart River	1906	Gibbon	34663-70	2477,3892
Barlow Creek	Clear Creek	1913	Kitto	34673	2517
Barney Pup	Clear Creek	1905	Gibbon	18089	3043-44
Battleford Creek	Mayo Creek	1904	McPherson	11490	3414
Bear Creek	Klondike River	1902	Gibbon	9825	2810
Bear Creek	Klondike River	1985	Thomson	70176	10575
Bedrock Creek	Sixtymile River	1907	Gibbon	17241	2454-56
Belcher Gulch	Klondike River	1907	Gibbon	17319	2794
Beliveau Creek	Duncan Creek	1903	Rinfret	10178	3447
Big Gold Creek	Sixtymile River	1907	Gibbon	17241	2454-6
Big Gold Creek	Sixtymile River	1980	Parnell	68648	10127
Bismark Creek	Montana Creek	1902	McPherson	10179	2483-84
Black Creek	Montana Creek	1902	McPherson	10179	2483-84
Black Hills Creek	Stewart River	1901	Gibbon	9542	2485-86
Black Hills Creek	Stewart River	1908	Gibbon	18090	2453
Blueberry Creek	Thistle Creek	1902	McPherson	10390	2457-58
Bonanza Creek	Klondike River	1897	Ogilvie	8284	3865
Bonanza Creek	Klondike River	1901	McPherson	10285	2799
Bonanza Creek	Klondike River	1901	McPherson	10294	2800
Bonanza Creek	Klondike River	1933	Dickson		7567-78
Bonanza Creek	Klondike River	1971	McDonald	58479	
Bonanza Creek	Klondike River	1979	Brennan	67118	9841
Bonanza Creek	Klondike River	1981	Aucoin	68163	3687
Boucher Creek	Sixtymile River	1902	Cautley	9558	7707
Boulder Creek	Bonanza Creek	1898	Gibbon	9603	2818
Bourdeleau Gulch	Hunker Creek	1902	Cautly	9558	7707
Box Creek	Steele River	1902	McPherson	10179	
Bullion Creek	Slims River	1904	Dickson		7757
Burwash Creek	Kluane River	1906	Dickson	12759-61	1702-3,2819
Butler Gulch	Boucher Creek	1902	Cautly	9558	7707
Cabin Creek	Nansen Creek	1912	Dickson	20053	1712-13
California Gulch	Bonanza Creek	1902	McPherson	10179	2483-84
California Creek	Sixtymile River	1914	Kitto	34674	2753-84
Caribou Creek	Dominion Creek	1904	Gibbon		7710-11
Cascade Creek	Mayo Lake	1904	McPherson	11491	2561
Center Creek	Nisling River	1912	Dickson	20053	1712-13
Childs Gulch	Black Hills Creek	1908	Gibbon	18090	2453
Christal Creek	McQuesten River	1903	McPherson	10239	3417
Clarke Creek	Scroggie Creek	1912	Kitto	34676	3476
Clear Creek	Stewart River	1905	Gibbon	18089,91	3052-3-3043-4
Clear Creek	Stewart River	1913	Kitto	34673	
Clear Creek	Stewart River	1985	Iles	70174	10576
Conglomerate Creek	Montana Creek	1902	McPherson	10179	2483-84
Cottoneva Creek	S.Big Salmon River	1902	McPherson	10359	1726
Courtland Creek	Nansen Creek	1912	Dickson	20053	1712-13

Stream	Tributary to	Date	Surveyor	Plan	Microplan
Cripple Creek	Yukon River	1986	Dupuis	70536	10711
Dago Gulch	Hunker Creek	1907	Green		2822
Dion Gulch	Yukon River	1908	McPherson		7748
Discovery Gulch	Black Hills Creek	1908	Gibbon	18090	2453
Dolly Creek	Nansen Creek	1912	Dickson	20053	1712-13
Dome Creek	Nisling River	1912	Dickson	20053	2001
Dominion Creek	Indian River	1900	Cote	9172	4643
Dominion Creek	Indian River	1902	Gibbon	10180	2770
Dominion Creek	Indian River	1918	Hawkins		2813
Dominion Creek	Indian River	1981	Welter	68166	3688
Dominion Creek	Indian River	1983	Aucoin	69030	10241
Dominion Creek	Indian River	1984	Aucoin	69639	10377
Dominion Creek	Indian River	1986	Mitchell	70929	10776
Dublin Gulch	Haggart Creek	1903	McPherson	10289	3054
Dublin Gulch	Haggart Creek	1980	Parnell		
Duncan Creek	Mayo River	1903	McPherson	3 10177	3418
Duncan Creek	Mayo River	1903	Rinfret	10178	3447
Duncan Creek	Mayo River	1903	Barwell	58577	
Dutton Pup	80 Pup	1985	Gray	70167	10543
Edmonton Creek	Mayo Lake	1904	McPherson	11490	3414
Eight Pup	Mayo Lake	1901	Gibbon	9608,9613	2802,7
Eighty Pup	Hunker Creek	1901	Gibbon	9609	2803
Eighty Pup	Hunker Creek	1985	Gray	70167	10543
Eldorado Creek	Bonanza Creek	1901	McPherson	9614-15	2808
Eldorado Creek	Bonanza Creek	1901	McPherson	9604	2873-74
Eldorado Creek	Bonanza Creek	1905	Gibbon	18091	3052,53
Eldorado Creek	Bonanza Creek	1933	Dickson	39900	
Eldorado Creek	Bonanza Creek	1982	Aucoin	68494	10108
Eliza Creek	Nansen Creek	1912	Dickson	20052	2001
Eureka Creek	Indian River	1902	McPherson		7709
Eureka Creek	Indian River	1902	McPherson	55028	7708
Eureka Creek	Indian River	1902	McPherson	10614	2482
Eureka Creek	Indian River	1900	Cote	9394	2827-8
Eureka Creek	Indian River	1987	Underhill	71059	11145
Examiner Gulch	Bonanza Creek	1908	McPherson		7748
Falconer Gulch	Yukon River	1908	McPherson		7748
Fifteen Pup	Last Chance Creek	1901	Gibbon	9613	2807
Fifty-one Pup	Barker Creek	1906	Gibbon	34669	2477
Fish Creek	Klondike River	1903	Gibbon	11494	2801
Fisher Creek	Montana Creek	1902	McPherson	10179	2483-84
Five Mile Creek	Sixtymile River	1914	Kitto	34674	2753-54
Flat Creek	Klondike River	1904	Gibbon		7710-11
Flat Creek	Klondike River	1983	Thomson	68972	10243
Forty Pup	Duncan Creek	1903	McPherson	10177	3418
Fourth of July Cr.	Jarvis River	1913	Dickson	34666-68	1863-64
Fox Gulch	Bonanza Creek	1901	McPherson	12069	2795
French Gulch	Eldorado Creek	1901	McPherson	9615	2808
Gay Gulch	Eldorado Creek	1901	McPherson	9614	2808
Gauvin Gulch	Bonanza Creek	1901	McPherson	12067	2796
Glacier Creek	Sixtymile River	1901	Dumais		4443
Glacier Creek	Sixtymile River	1907	Gibbon	17241	2454-56
Glacier Creek	Sixtymile River	1980	Parnell	68648	10127
Glacier Creek	Big Gold Creek	1980	Keopke	69154	10279

Stream	Tributary to	Date	Surveyor	Plan	Microplan
Gold Bottom Creek	Hunker Creek	1901	Gibbon	9612	2805-6
Gold Run Creek	Dominion Creek	1902	McPherson	10181	2797-98
Gold Run Creek	Dominion Creek	1981	Welter	68166	3688
Goring Creek	Klondike River	1910	McPherson		7560
Granite Creek	Boucher Creek	1902	Cautley	9558	7707
Guysboro Gulch	Klondike River	1907	Gibbon	17319	2794
Haggart Creek	McQuesten River	1903	McPherson	10289	3054
Haggart Creek	McQuesten River	1980	Parnell		
Hattie Gulch	Hunker Creek	1907	Gibbon	17319	2794
Henry Gulch	Hunker Creek	1901	Gibbon	9607	2802
Hester Gulch	Hunker Creek	1901	Gibbon	9611	2804
Hester Creek	Hunker Creek	1984	Aucoin	69640	10379
Henderson Creek	Yukon River	1901	Gibbon	9542	2485-86
Highet Creek	Minto Creek	1904	McPherson	11489	3055
Hodgen Creek	Montana Creek	1902	McPherson	10179	2483-84
Homestake Gulch	Bonanza Creek	1901	McPherson	9847	2811
Hunker Creek	Klondike River	1901	Gibbon	9606,7,11	2802-4
Hunker Creek	Klondike River	1902	Gibbon	10180	2770
Hunker Creek	Klondike River	1977	Koepke	65451	9623
Hunker Creek	Klondike River	1902	Gibbon	8636,9824	2831-32,2809
Hunker Creek	Klondike River	1967	Holt	53536	
Hunker Creek	Klondike River	1980	Aucoin	67557	944
Hunker Creek	Klondike River	1982	Aucoin	68595	10150
Huot Gulch	Boucher Creek	1902	Cautley	9558	7707
Indian River	Yukon River	1900	Cote	9172	4643
Indian River	Yukon River	1934	Dickson	39217-18	2474-75
Indian River	Yukon River	1936	Dickson	39321-22	692
Indian River	Yukon River	1938	Dickson		7987
Indian River	Yukon River	1981	Koepke		
Indian River	Yukon River	1981	Welter	68166	3688
Indian River	Yukon River	1982	Koepke	68495	10110
Indian River	Yukon River	1984	Aucoin	69641	10380
Indian River	Yukon River	1986	Iles	70538	10713
Iron Creek	Barker Creek	1906	Gibbon	34669-70	2477,3899-902
Iron Creek	Nisutlin River	1988	Lamerton	71815	11144
Isaacs Gulch	Flat Creek	1904	Gibbon		7710-11
Italian Creek	Montana Creek	1902	McPherson	10179	2483-84
Jackson Gulch	Klondike River	1980	Aucoin	67132	9845
Jarvis River	Kaskawulsh River	1913	Dickson	34666-68	1863-64
Jones Gulch	Black Hills Creek	1908	Gibbon	18090	2453
Keystone Creek	Mayo Lake	1903	McPherson	10240	3417
Kitchener Creek	Steele River	1902	McPherson	10179	2483-84
Klondike River	Yukon River	1902	White-Fraser	54370	
Klondike River	Yukon River	1980	Aucoin	67133	9846
Klondike River	Yukon River	1989	Dupuis	72345	11429
Lake Creek	S.Big Salmon River	1902	McPherson	10359	1726
Last Chance Creek	Hunker Creek	1901	Gibbon	9605,8,10 13	2802,3,7
Last Chance Creek	Hunker Creek	1983	Keopke	69106	10244
Last Chance Creek	Hunker Creek	1985	Gray	70168	10544
Ledge Creek	Mayo Lake	1904	McPherson	11492	2560
Lepine Creek	Rock River	1903	Gibbon	11494	2801,8018
Lightning Creek	Duncan Creek	1903	McPherson	10177 (55071)	3418(7727)

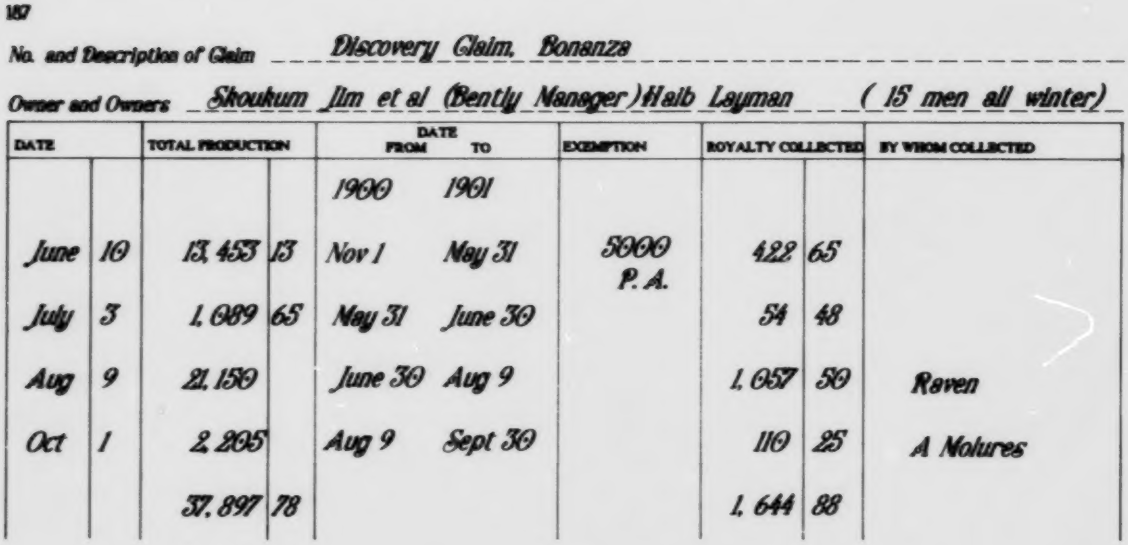
Stream	Tributary to	Date	Surveyor	Plan	Microplan
Lightning Creek	Duncan Creek	1903	Barwell	58577	
Lindow Creek	Bear Creek	1902	Gibbon	9825	2810
Lion Gulch	Caribou Creek	1904	Gibbon		7710-11
Little Blanche Cr.	Quartz Creek	1909	McPherson		1425
Little Gold Creek	Big Gold Creek	1980	Parnell	68648	10127
Little Skookum Pup	Bonanza Creek	1901	McPherson	9847	2811
Livingstone Creek	S.Big Salmon River	1902	McPherson	10359	1726
Lovett Gulch	Bonanza Creek	1901	McPherson	12069	2795
Lovett Gulch	Bonanza Creek	1980	Brennan	67265	mylar
Lucky Creek	Allgold Creek	1902	Gibbon	9824	2809
Magnet Gulch	Bonanza Creek	1901	McPherson	12069	
Mariposa Creek	Scroggie Creek	1912	Kitto	34676	2476
McKay Gulch	Bonanza Creek	1901	McPherson	9847	2811
McRae Gulch	Highet Creek	1904	McPherson	11489	3055
McRae Gulch	Highet Creek	1906	Gibbon	34669-70	2477,3899-902
Miller Creek	Sixtymile River	1909	McPherson		7436
Miller Creek	Sixtymile River	1981	Aucoin	67918	2463
Mint Gulch	Hunker Creek	1901	Gibbon	9606	2802
Minto Creek	Mayo River	1912, 1914	Kitto	31763,65	3041-42
Montana Creek	Indian River	1902	McPherson	10179	2482-84
Moose Creek	Fortymile River	1907	Gibbon		4443
Nansen Creek	Nisling River	1912	Dickson	20051-53	2001,1712-14
Nelson Gulch	Sixtymile River	1902	Cautley	9558	7707
Nevada Creek	Dominion	1985	Gray	70169	10545
Newbauer Creek	Nisling River	1912	Dickson	20053	1712-13
Nigger Jim Gulch	Bonanza Creek	1901	McPherson	9847	2811
Nineteen Pup	Bonanza Creek	1901	McPherson	9847	2811
No Name Creek	Montana Creek	1902	McPherson	10179	2483-84
Nugget Gulch	Eldorado Creek	1901	McPherson	9614	2808
O'Neill Gulch	Bonanza Creek	1901	McPherson	9847	2811
Parent Creek	Duncan Creek	1903	Rinfret	10178	3447
Portland Creek	Dominion Creek	1986	Gray	70537	10712
Preacher Creek	Barker Creek	1906	Gibbon	34669-70	2477,3899-902
Quartz Creek	Indian River	1900	Cote	9172	4643
Quartz Creek	Indian River	1980	Welter	68165	mylar
Quartz Creek	Indian River	1980	Wrzosek	68165	3020
Rabbit Gulch	Hunker Creek	1907	Gibbon	17319	2794
Randler Gulch	Boucher Creek	1902	Cautley	9558	7707
Rudolph Gulch	Highet Creek	1904	McPherson	11489	3055
Scroggie Creek	Stewart River	1912	Kitto	34676	2476
Sharpe Creek	Scroggie Creek	1912	Kitto	34676	2476
Shaw Creek	Nansen Creek	1912	Dickson	20052	2001
Sidney Creek	Nisutlin River	1988	Lamerton	71815	11144
Rusk Creek	Nisling River	1912	Dickson	2005	2001
Sixtymile River	Yukon River	1907	Gibbon	17241	2454-56
Sixtymile River	Yukon River	1914	Dickson	34663-65	2755-57
Sixtymile River	Yukon River	1914	Kitto	34674	2753,54
Sixtymile River	Yukon River	1981	Aucoin	67918	2463
Skookum Gulch	Bonanza Creek	1901	McPherson	9847	2811
Slate Creek	Nansen Creek	1912	Dickson	20049	2001
Sock Creek	Klondike River	1903	Gibbon	11494	2801
Spring Gulch	Bonanza Creek	1901	McPherson	9847	2811

Stream	Tributary to	Date	Surveyor	Plan	Microplan
Steele River	Montana Creek	1902	McPherson	10179	2483-84
Steep Creek	Mayo Lake	1904	McPherson	11493	3413
Stevens Creek	Scroggie Creek	1912	Kitto	34676	2476
Stowe Creek	Montana Creek	1902	McPherson	10179	2483-84
Sluphur Creek	Dominion Creek	1912	Kitto	8599-600	7561
Summit Creek	S.Big Salmon R.	1902	McPherson	10359	1726
Summit Creek	Nisling River	1912	Dickson	20053	1712-13
Tenmile Creek	Sixtymile River	1912	Kitto	134675	2477
Thirteen Gulch	Eldorado Creek	1916	Brownlee		2812
Thistle Creek	Yukon River	1902	McPherson	10390	2457-58
Trail Gulch	Bonanza Creek	1901	McPherson	12069	2795
Twelvemile Creek	Sixtymile River	1914	Kitto	34674	2753-54
Twenty Gulch	Hunker Creek	1907	Gibbon	17319	2794
Twenty-one Gulch	Hunker Creek	1907	Gibbon	17319	2794
Vermont Creek	Steele River	1902	McPherson	10179	2483-84
Victoria Gulch	Bonanza Creek	1901	McPherson	12068	2796
Victoria Creek	Nisling River	1912	Dickson	20048	1715
Victoria Gulch	Upper Bonanza	1985	Thomson	70173	10578
Webber Creek	Nansen Creek	1912	Dickson	20053	1712-13
Walhalla Creek	Scroggie Creek	1912	Kitto	34676	2476
Williams Creek	Duncan Creek	1903	McPherson	10177	3418
Williams Creek	Duncan Creek	1903	Rinfret	10178	3447

SELECTED EXCERPTS FROM A BRIEF HISTORY OF PLACER MINING IN THE YUKON

By

G.W. Gilbert



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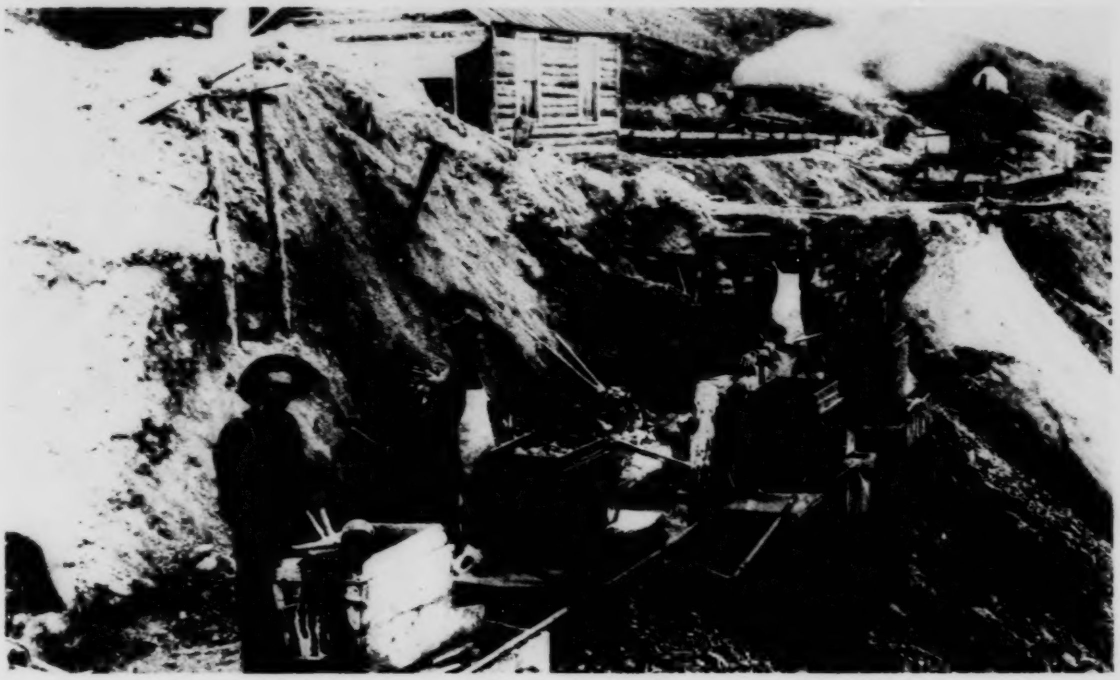
No. and Description of Claim Discovery Claim, Bonanza

Owner and Owners Skoukum Jim et al (Bently Manager) Halb Layman (15 men all winter)

DATE		TOTAL PRODUCTION		DATE FROM	TO	EXEMPTION	ROYALTY COLLECTED		BY WHOM COLLECTED
				1900	1901				
June	10	13, 453	13	Nov 1	May 31	5000 P. A.	422	65	
July	3	1, 089	65	May 31	June 30		54	48	
Aug	9	21, 150		June 30	Aug 9		1, 057	50	Raven
Oct	1	2, 205		Aug 9	Sept 30		110	25	A Molures
		37, 897	78				1, 644	88	

Excerpt from 1900 - 1901 Mining Recorders Royalty Records



KING SOLOMON'S MINE
A group of miner's "Rocking" on King Solomon's Hill 1898

"ELDORADO UNDERGROUND"
Two Miners with picks, shovels and wheel barrows working
underground on claim No. 16 on Eldorado Creek 1898.
It is very likely steam was being used to thaw the ground.

EARLY GOLD DISCOVERIES

It was HBC explorer Robert Campbell who first reported gold in the Yukon at Fort Selkirk about 1850. (The original fort was on the south bank of the Pelly across the Yukon River from is present site). Campbell saw gold on a gravel bar in front of the fort but was apparently not impressed. (This may have been the same bar that Robert Henderson rocked three ounces of fine gold from in 1894).

Between 1848 and 1858 there had been three major gold rushes in the world-in California, Australia and the Cariboo-therefore there were many experienced prospectors searching for new placer deposits.

In 1861 gold was discovered on bars in the Stikine River; this area was adjacent to the Yukon and foreshadowed penetration of the Territory by miners. The Russians, although they had never shown any interest in mining, sent the corvette **Rhynda** to ensure that the mining was not being carried out in their territory, as the Crimean War five years earlier had not helped Russo-British relations.

The following year at Fort Yukon, Reverend McDonald reported gold which he could have gathered with a spoon on a small river not far from Fort Yukon. This was undoubtedly "The Preacher's Creek", a fork of Birch Creek in the Circle gold fields, not rediscovered until 1893.

Frederick Whymper, in an account of his explorations in 1866 and 1867 on behalf of the ill-fated Collins Overland Telegraph line to Siberia, noted that "tiny specks of gold had been found by HBC men in the Yukon". He did not elaborate.

Events in 1867 were to have far-reaching effects on the Yukon. To the horror of its populace, the United States purchased Alaska from Russia, which heaved a sigh of relief. Meanwhile, a confederation was formed uniting all British lands in North America. The new Canadian Parliament opened negotiations the following year to buy Rupert's Land (i.e. the bulk of the present Canadian territory) from the HBC. A settlement, however, was not reached until 1870, so the Yukon remained in HBC control until that date.

PROSPECTING PARTIES REACH THE YUKON

By 1872 the Cariboo gold rush had cooled and prospecting parties struck out in search of new pay gravels. Two of these parties chanced to meet on the Liard at Nelson Forks and decided to join forces.

Three members were to become famous in the history of the Yukon: Arthur Harper, Leroy McQuesten and Albert Mayo. Prospecting the Liard proved too slow and laborious, so they decided to drift down the Mackenzie and enter the Yukon via Rat Pass and the Porcupine. (They were probably unaware that prospectors had preceded them up the Liard and found paying bars above the mouth of the Smith River in British Columbia). Harper reported that they found colours on the Liard, nothing on the Mackenzie, "fair prospects" on the Peel, some colours on the Porcupine, and finally, "colours everywhere" on the Yukon.

Immediately upon arriving at the Yukon River in 1873, Harper undertook an expedition up the White River to investigate the reported source of native copper, a sample of which had been shown to him by an Indian at Fort Yukon. This trip was unsuccessful. At the same time the Liard prospectors, who had wintered with the bar miners on the Stikine, discovered rich creeks at Dease Lake. By 1874 there were 1,500 miners in the area and predictably, many of these formed parties to prospect the surrounding regions.

One such expedition ascended the upper Liard into Yukon Territory. At Sayyea Creek they discovered coarse gold in 1874-the first in the Territory. The deposit was not rich compared to Dease Lake: four men worked for 115 days to recover 77 ounces including some one-ounce nuggets. The remote and inhospitable nature of the region caused much hardship for the twelve-man party and after four of its members died of scurvy (on Scurvy Creek) the diggings were abandoned.

Similar parties prospected on the Frances, Yusesyu and Hyland Rivers but found no economically viable deposits. One exception was the mouth of the Finlayson River on Frances Lake where a miner recovered about $8 to $9 per day-probably about wages if the high cost of supplies was considered. In any event, this miner stayed a very short time on this deposit in 1876.

CONSTANTINE AND THE NWMP

Another first for the Yukon was the arrival of Inspector Charles Constantine of the North West Mounted Police, who had been sent North to report to Ottawa on conditions in the Territory. He reported that the Canadian part of the Fortymile was almost worked out and Clinton Creek had proved to be poor, in fact a great number of the recent influx of miners had moved downriver to the Circle area. The local population-approximately half American and half Canadian-on finding a new symbol of authority in their midst, renewed their complaints about the mining laws. Constantine was instrumental in having the length of a claim increased to 500 feet. He also overruled a decision by a miners meeting, and these institutions disappeared forever from the Canadian scene.

Veteran prospector Robert Henderson arrived during the summer. Finding the Fortymile and Sixtymile rivers too crowded, he decided to prospect the Indian River. He and two partners had prospected the Pelly earlier with discouraging results; the partners decided to turn back, leaving Henderson to prospect alone. Grubstaked by Ladue, he systematically explored the Indian and its tributaries during 1894 and 1895. Australia Creek was practically barren so he turned downstream to the creek where he found the best prospects, naming it Quartz Creek.

In 1895 Constantine returned to Forty Mile with twenty members of the North West Mounted Police to construct their new headquarters, Fort Constantine. At a time when wages on the creeks ranged from six to ten dollars a day, the Mounties were paid only fifty cents. Upon completion of the barracks, the police, unable to afford firewood at eight dollars a cord, went upriver and cut 315 cords for the winter. Constantine wrote to Ottawa asking higher wages for his men, and at the same time, suggesting several changes to the mining regulations which would benefit the miners. As a result, staking procedures were simplified, the staking age was dropped to 18 years from 21, and a prospector discovering a new creek was allowed two 500 foot claims rather than one. The daily wage for a constable was raised to one dollar.

Ogilvie noted that the improved staking rules had little effect on the calibre of staking: "less than twenty-five percent of claims were staked in any way approaching the prescribed manner".

During the winter of 1895-96, 350 miners worked on Miller, Glacier and Bedrock Creeks. Most of the Miners on the Fortymile were on the Alaskan side, although the Canadian portion of Moose Creek was also mined. The estimated production of 1894 and 1895 was about 18,000 ounces per year, and the forecast for 1896 was about the same.

Meanwhile, Robert Henderson spent the winter of 1895-86 "burning down" on Quartz Creek; his clean-up in the spring totalled forty ounces. Convinced that he was finally in a gold-bearing area, he ascended Quartz Creek and crossed the divide into a creek he called Gold Bottom. There he found his best prospect to date.

Henderson was not the only prospector exploring new country: in 1895 miners working their way up the Stewart and McQuesten Rivers discovered Haggart Creek. They reported some gold in most of the creeks entering the McQuesten from the north; the river bars themselves yielded only fine gold for ten miles above the Stewart. It may have been then the Pelly miners decided there were no paying prospects on that river although most of the streams entering the Pelly from the south between the Lapie and Campbell Creek were later found to contain gold. The best prospects were between the mouth of the Hoole and Hoole Canyon as well as some tributaries of the Hoole. A paying prospect was considered in those days gravels yielding not less than three-quarters of an ounce per cubic yard, since two men on a rocker could only process one-and-one-half to four yards per day.

The year 1896 proved to be the most important one in the history of the young Territory.

Forty Mile had become fairly established as the commercial and administrative centre for the mining industry and was becoming relatively civilized. Residents welcomed the arrival of forty head of cattle which had been driven over the new Dalton Trail from Haines to Fort Selkirk and then rafted down-river. A sawmill had been shipped in via St. Michael and its operators were in the market for saw logs since most readily available timber had already been cut.

BONANZA!

George Carmack and two native companions, salmon fishing at the mouth of the Klondike, decided they would become part-time loggers. About that time Henderson stopped at Carmack's camp on his way back to Gold Bottom, told them of his good prospects in this new area east of the Yukon, and invited Carmack (but not the Indians) to stake on his creek.

Carmack promised to visit Gold Bottom reluctantly; he was more interested in logging. Accordingly, he sent Skookum Jim up Rabbit (later Bonanza) Creek to look for good trees and to check whether logs could be floated down it. In the course of this task Jim saw colours in the creek near where 66 Below Discovery claim would soon be located (near Sourdough Gulch). Carmack, the virtual director of the party, refused to be swayed by Jim's enthusiasm. He decided against pursuing either the prospecting or logging venture, and the group settled down to fishing again. A few weeks later, Carmack changes his mind again, deciding that they would visit Henderson and do some prospecting. On their way up Bonanza, they found a ten-cent pan near the place they would later make their discovery. Their visit with Henderson proved a disappointment both with respect to his creek and his racist attitude toward Skookum Jim and Tagish Charlie, and they returned to Bonanza on August 14. Jim was sent ahead to hunt and succeeded in shooting a moose. While waiting for the others he found the best prospect yet and the three amateur prospectors spent the next two days testing the creek for the heaviest concentrations of gold. On August 16, Carmack decided they should stake, and the three argued all day about who was to have the discovery claim. Carmack, half-Indian himself yet suddenly taking Henderson's Archie Bunker attitude, insisted the mining recorder would never record a discovery claim for an Indian. When they staked the next morning, Carmack's name was on Discovery but he had agreed to assign half of it to Jim.

STAKING THE KLONDIKE

In the next three months 500 claims were staked on the Klondike creeks and the Yukon entered a new era. Bonanza and Eldorado proved to be two of the richest creeks ever found. For example, Eldorado No. 17, a 425-foot claim, yielded 125,000 ounces (4.3 tons of gold worth $90,000,000 at 1980 prices). Lowe's 86-foot fraction just below Grand Forks produced more than 400 ounces for each foot of creek and further gold was recovered later by dredge.

It was almost a year before news of the strike reached the "outside" and by that time most of the creeks had been staked by local miners. Forty Mile and Circle City were essentially deserted and even the rich Sixtymile creeks were abandoned for a time. The influx of thousands of would-be miners over the Chilkoot and other routes was not altogether due to the electrifying news: North America was suffering a severe depression and unemployment was at an all-time high. Few of these latter-day Argonauts would find claims, let alone fortunes, and many left the Territory before long. Many stayed, however, some to prospect widespread areas of the Yukon and Alaska, others to supply the labour force for the placer mines.

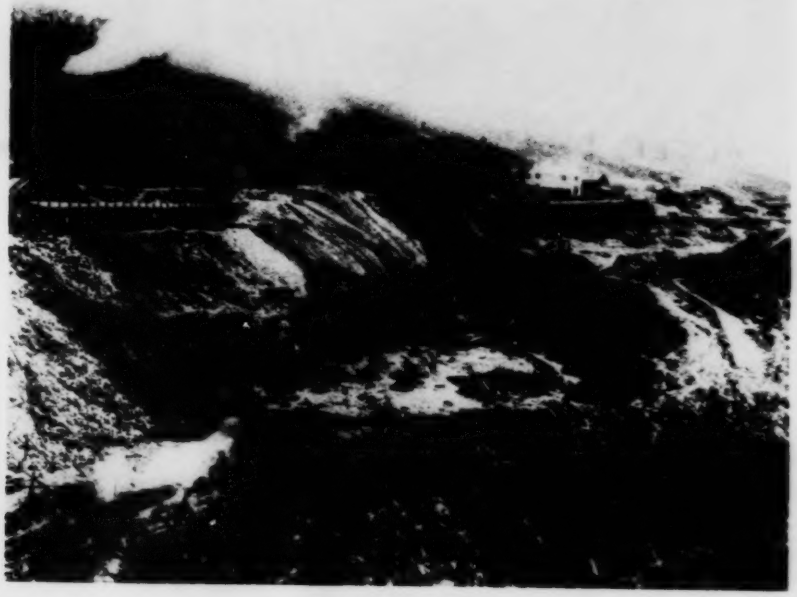
MINING METHODS

The mining procedures before Bonanza and the first few years after were very labour-intensive. The cost of bringing it 4,000 miles by steamship precluded the use of expensive machinery. Two mining methods prevailed, underground mining and open cut. The former made more sense since most of the excavation could be accomplished during the long, cold winters when wages were lower than usual and recovery of the gold could be effected during the spring runoff.

The procedure was usually as follows. Thawing by fire, a shaft was "burned down" to bedrock, and the frozen muck was removed by pick, shovel and windlass. (This system worked well only in the winter when the temperature difference between the air in the shaft and the surface created a good draught. In fact, many miners were incapacitated by smoke inhalation or killed by poisonous gases while trying to "burn-down" during the summer). Once bedrock was reached the deposit was drifted from the shaft; again wood fires were used for thawing. About a quarter cord of wood was required for each cubic yard of muck or gravel. Miners started excavation of the drift walls at the maximum distance from the shaft, working back to it. Two miners could bring three or four cubic yards to surface in a long working day. The frozen roof of the workings during winter was exceptionally competent and required few, if any, supports: McConnell cites an unsupported 140 foot by 230 foot "room" on Dominion Creek. When summer arrived, these rooms usually collapsed but by that time the miners were busy sluicing on the surface.

About 1902 fire-thawing was superseded by more efficient (and safer) steam thawing, a technique which could be used year-round (thawing via heated rocks dropped in the shaft had been discontinued in the 1880's). In 1903 McConnell reported that an average claim required fifty horsepower (wood-generated steam) for thawing, hoisting and pumping sluice water. The capital cost was from $5,000 to $7,000 and the daily operating cost, including labour, was about $100 for 50 to 60 cubic yards thawed, mined, hoisted and sluiced. (Heavy machinery was not readily available until 1900 when the White Pass railway was completed to Whitehorse). The introduction of machinery about 1901 coincided with the depletion of the exceptionally rich deposits; it is unlikely that the lower grade gravels could have been worked profitably much longer by hand methods. Before the advent of machines, open-cut mining costs were often prohibitive unless the overlying waste materials were very shallow. After about 1904 little underground work was done, almost all mining since has been by such open-cut methods as dredging, hydraulicing, bulldozer, loader and scraper operations. Today, ground rich enough to mine by hand methods is practically nonexistent even with the dramatic increases in gold price.

"HYDRAULIC MINING"
Allgold Creek, Yukon.



ELDORADO CREEK
Partial panorama looking upstream at an open cut
placer operation at the turn of the century.

Before Bonanza, wages on the Fortymile and Sixtymile had been six to ten dollars a day. In 1897 they were fifteen dollars, but after the arrival of the stampeders, an employer in the Klondike could hire a man for $4.50 and board per ten-hour day. Board was expensive in the Yukon-it cost almost a dollar a day to feed a man. The only item which remained constant was the price of gold: $20.67, or about $16 per raw ounce average (the price of an ounce of gold varied only a few cents either side of $20 from 1792 to 1934). As labour and supply costs dropped, "poor prospects" suddenly became profitable and regional prospecting was intensified.

THE DREDGES

Most dredging operations did not begin until after 1904 with one exception: a small steam dredge using three-and-a-quarter cubic foot buckets was put into production on Cassiar Bar below Hootalinqua in 1898. With an average production of five cents in gold per cubic yard dredged it was a financial disaster, and bar dredges in the Yukon since that time have suffered a similar fate, for bar diggings rarely exceeded a foot in depth. The Cassiar Bar unit was moved to 42 Below Discovery on Bonanza, a half mile below Boulder Creek in 1899, and two years later to Discovery. In 1911 it was moved to the Circle District where it proved too small to dig bedrock and was abandoned on Mastodon Creek.

When the first large dredge appeared in the Klondike Valley in 1905 the independent miner had practically disappeared from major creeks. The lower-grade gravels required a massive investment for machinery and installations and the gold fields were rapidly taken over by mining corporations. Despite vigorous opposition from the men Ogilvie called "gumboot miners", Ottawa granted huge blocks of land known as hydraulic concessions to several mining promoters-even over existing claims.

Although this practice was later discontinued those concessions already granted were allowed to stand. The Anderson Concession on Lower Hunker, granted in 1898, did not lapse until 1969, and the famous Boyle Concession in the Klondike River Valley remained in good standing from 1900 to 1969. Ottawa's scheme to attract major companies to the gold fields was subsequently proved to have been the right course, even if it was executed in a somewhat ham-handed manner. It meant that placer mining could settle down as an industry based on sound engineering principles, and the boom and bust days were over.

DISCOVERY OF BENCH DEPOSITS

In 1897 gold was discovered in the White Channel gravels on Gold Hill several hundred vertical feet above Eldorado Creek. At first the miners paid little attention to the find, because it was made by an inexperienced prospector or "cheechako". Yet these high-level gravels, which occurred in tremendous volumes throughout the Klondike, eventually yielded most of the gold that was mined in the Yukon. Called bench deposits, they could not be mined by dredges, and underground methods were costly, inefficient and hazardous. Hydraulic mining, although ideally suited to the task, required vast amounts of cheap water which simply were not available in the Klondike region.

The first proposal for bringing water to the gold fields under sufficient head envisioned tapping the headwaters of the South Klondike River, 130 miles upstream. This scheme was later abandoned in favour of a ditch-and-siphon system to bring water from the Twelve Mile River drainage seventy miles away. When the Twelve Mile project was completed in 1909, it included a hydroelectric plant for the benefit of the ten operating dredges. To the companies pumping costly water up to the benches, the Twelve Mile Ditch was very welcome indeed.

Empirical figures from hydraulic operations in California and Cariboo placer fields had shown that about one-and-a-half gallons of water were needed to move and wash one pound of gravel. McConnell estimated reserves of bench gravels in 1906 well in excess of 100 million cubic yards. At 2,700 gallons per yard, this represented an appreciable amount of water: the Twelve Mile Ditch, not abandoned until 1933, supplied barely enough.

FURTHER EXPLORATION IN THE TERRITORY

While Klondike area mining held the attention of the mining fraternity and the general public, the prospectors were not idle. After Bonanza many of the "gold-rushers", unable to find claims in the Klondike, set out to find other placer fields in the Territory and Alaska. Experienced Yukon prospectors also joined in the search, among them Robert Henderson. He had neglected to record his discovery claim on Gold Bottom and had been evicted by more law-abiding stakers. Swallowing his bitterness, he began prospecting tributaries of the Stewart River, possibly Henderson and Black Hills Creeks.

In the same year as Bonanza, Jack Dalton of Dalton Trail fame mentioned reports of gold in the "Dassar-Dee-Ash." Further documentation was not forthcoming and it can only be assumed that he referred to either Alder, Shorty or Squaw Creek near the present day Haines Road. Johnson Creek, a tributary of the McQuesten River, was discovered about the same time as Gold Hill's bench placers.

About 1897, Ottawa had imposed a royalty on gold that was mined in the Territory. (In 1898, "Yukon Territory" had replaced the old name "Yukon District of the Northwest Territories". Yukon was now a separate political entity.) Apparently based on fantastic reports of Bonanza clean-ups, Ottawa decided that royalty to the Crown would be ten percent of gold in excess of $5,000 per year and twenty percent in excess of $5,000 per week. It was not until 1904 that the government insisted that royalty be paid in currency rather than raw gold, but by that time royalty had been dropped to 2.5 percent in a measure to attract dredging companies. But royalties were the least of the prospectors' problems.

In 1898 the Stewart River tributaries were discovered: Scroggie, Barker, Henderson and (surely) Clear Creek. Slightly up-river were Thistle, Kirkman, and Ballarat. Miles from the Klondike, prospectors found Duncan and Dublin Gulch in the Mayo area, Hayes Creek in the Dawson Range, and Alder Creek in the Dezadeash.

J.B. Tyrrell while traversing the Dalton Trail noted that colours of gold could be found on the trail everywhere creeks cut the quartz-bearing schists. Good prospects were found halfway between the Coast Range and Fort Selkirk according to Ogilvie: this could be somewhere between Albert Creek and Maloney (or either). A two-man prospecting party on the South Big Salmon River discovered coarse gold on a creek they named "Livingstone". One of the men was George Black, later to become Commissioner.

In 1899 Shorty Creek in the Dezadeash was found and although unrecorded, probably other creeks in the area were discovered. In this year Nansen Creek was found but, for some reason was not staked and mined until about 1910. Strikes in Alaska, meanwhile, siphoned off many Yukon prospectors to those areas; most were inveterate stampeders like their predecessors in the late 1890's.

THIRTY-SEVEN TONS OF GOLD

The year 1900 was to be Yukon's biggest year ever for gold production.

Although most of the inhabitants were unaware of the outstanding production of gold, the British Yukon Navigation Company received over thirty-seven tons of gold for shipment "Outside". The last people to hear about this record were the prospectors, who were busy elsewhere.

The Macmillan River, considered a barren stream by early prospectors, received some attention in 1902 when course gold was found on Russell Creek.

The year 1903 saw discovery of the Kluane goldfields in spite of the loss of miners to the Fairbanks rush. Bullion and Sheep creeks in the west of the Kluane district, Fourth of July and Gladstone in the east and the Kathleen Lake creeks in the south all yielded course gold. In the Mayo area, Minto, Highet and Mayo Lake tributaries proved to be viable placer creeks.

Next year Burwash, Tatamagouche and Arch creeks were found in the Kluane country. Most of the streams flowing into the Shakwak valley were found to contain some gold and frequently native copper. Burwash would later produce more gold than the total of the others.

The Teslin prospectors discovered the Boswell River creeks: Little Bear, Machete, Falls and others. They then crossed the divide into Nisutlin drainage where they found good prospects on Sidney and Iron creeks.

About 1905 on the upper Stewart River, prospectors found little encouragement. The bars above the Mayo River were very lean and colours were rare above the mouth of the Beaver. The latter stream was barren although a small creek opposite the mouth of the Rackla carried some course gold. On the Stewart, between Lansing and the Hess, some of the left-limit tributaries provided "good prospects" but little work seems to have been done until 1910.

With the exception of Matson Creek in 1911, few new placer creeks were reported until 1913 when some of the White River tributaries were found, including the Koidern River and the Tchawsahmon Lake area. Continuing up the White into Alaska, prospectors discovered the Chisana area, the Tchawsahmon creeks were immediately abandoned.

THE WORLD WARS

In 1915 Rude, Canadian and other Dawson Range Creeks were worked. Canadian Creek was found to have considerable wolframite in the concentrate; Dublin Gulch much scheelite. Both these tungsten minerals were in great demand by the steel industry for World War I weaponry, but only Dublin Gulch proved to have economic deposits.

The war had severely reduced the number of prospectors, but those who remained continued to find good prospects in widespread areas of the Territory. The lower Stewart River creeks, tributaries on the Nisling, Klotassin, Jarvis and Kluane Rivers, the Ladue tributaries (Rice, Otter and Deep), and new creeks in the Sixtymile drainage all proved to have some course gold but no new bonanzas. A short lived rush on Seymour Creek in the Dawson Range in 1917 resulted in discoveries of marginal deposists there and on Stoddart, Williams and Maurice creeks. Probably many other streams throughout the Territory were prospected and even mined but documentation (if any) is not readily available.

Government reports from 1900 to 1930 dealt with the activities of producing placers more than those of the prospectors. The dredges and hydraulic operations in the Klondike were the mainstay of the Yukon's economy. Probably the most important innovation during those years was the adoption of cold-water thawing. This procedure, developed by Alaskan miners in 1919, substantially reduced the cost of thawing so that previously marginal gravel reserves became economic. Several small dredges were put into operation in areas other than the immediate Klondike: on the Stewart in 1902 and 1911, on the Fortymile about 1912, on Miller Creek in 1912, and on Highet Creek in 1922. Only the Miller and Highet dredges made a profit. Prospecting in the 1920's reached a low ebb: the most notable find was Squaw Creek on the Tatshenshini but like the Fortymile, the best deposits were outside of the Territory's boundaries.

Then in January 1934, the U.S. government set the price of gold at $35.00-almost double the old price. Existing operations were intensified and another wave of prospectors flowed through the Yukon. As in 1898, a Depression initiated this movement of men, but this time they had the advantage of a higher gold price and almost forty years of technological advance.

Most of the Yukon placer creeks were reactivated, mostly by hand-mining methods. Many previously marginal deposits could now be mined at profit-two pennyweights of gold per man per day was very good pay. Capital expenditure for basic hand-mining equipment was equivalent to about a half ounce of gold. This new era of "gumboot miners" lasted a few years beyond the outbreak of World War II in 1939 and it was probably during this interval that bulldozer or "cat"-mining became common. In addition to the historically productive creeks, some of the "low-grade" areas mined during the Depression included the Upper Liard, Frances Lake area, Teslin tributaries, right-limit South Big Salmon creeks, Dezadeash and Kluane, McQuesten and Stewart tributaries, and many tributaries of the Yukon.

By the end of the war in 1945, the cost of labour and supplies had risen to the extent that most of the creeks could no longer be mined profitably, and mining activity again returned to the proven placer areas. By the end of the 1940's gold mines in all areas of Canada were closing down because of higher costs and the fixed price of gold. The federal government, in a move to aid the remaining mines, introduced a subsidy on gold production. Most placer miners in the Territory took advantage of this subsidy until the rise of the gold price in the early 1970's. Ottawa also amended the Yukon Placer Mining Act to reduce the royalty to 22 1/2 cents per ounce. The current royalty is 37 1/2 cents per ounce.

Some drilling had been done on Hayes Creek during the war, and in spite of the gloomy outlook for placers during the post-war years, some new exploration and mining continued to take place. There was drilling done on the Duke River in Kluane, the Blow River in the Arctic, and Big Creek in the Dawson Range. The Klondike dredges and hydraulics continued to operate and dredging started on Thistle, Henderson, Clear and Big Gold creeks. Little gumboot prospecting appears to have been done.

In the mid 1960's most placer operations had ceased and in 1966 even the giant Yukon Consolidated Gold Corporation shut down the last of its dredges. A handful of miners continued to operate in the Territory but few were able to make a reasonable profit. Most of these operations were man-and-wife teams, old-timers or hobby miners.

The rising price of gold in the early 1970's created new interest in placer again and by 1973 most of the historic producing streams had been restaked. As the gold price continued to accelerate in the late '70s staking and mining increased accordingly. By 1979 not only were most of the known gold-bearing creeks entirely staked but also many streams flowing through the most unfavourable geological settings imaginable. Most of the "prospecting" was done in old mining records.

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M268	Kindle E.D.	Dezadeash area	1952
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M203	Lees E.J.	Teslin - Quiet Lake	1936
M340	Muller J.E.	Kluane Lake area	1967
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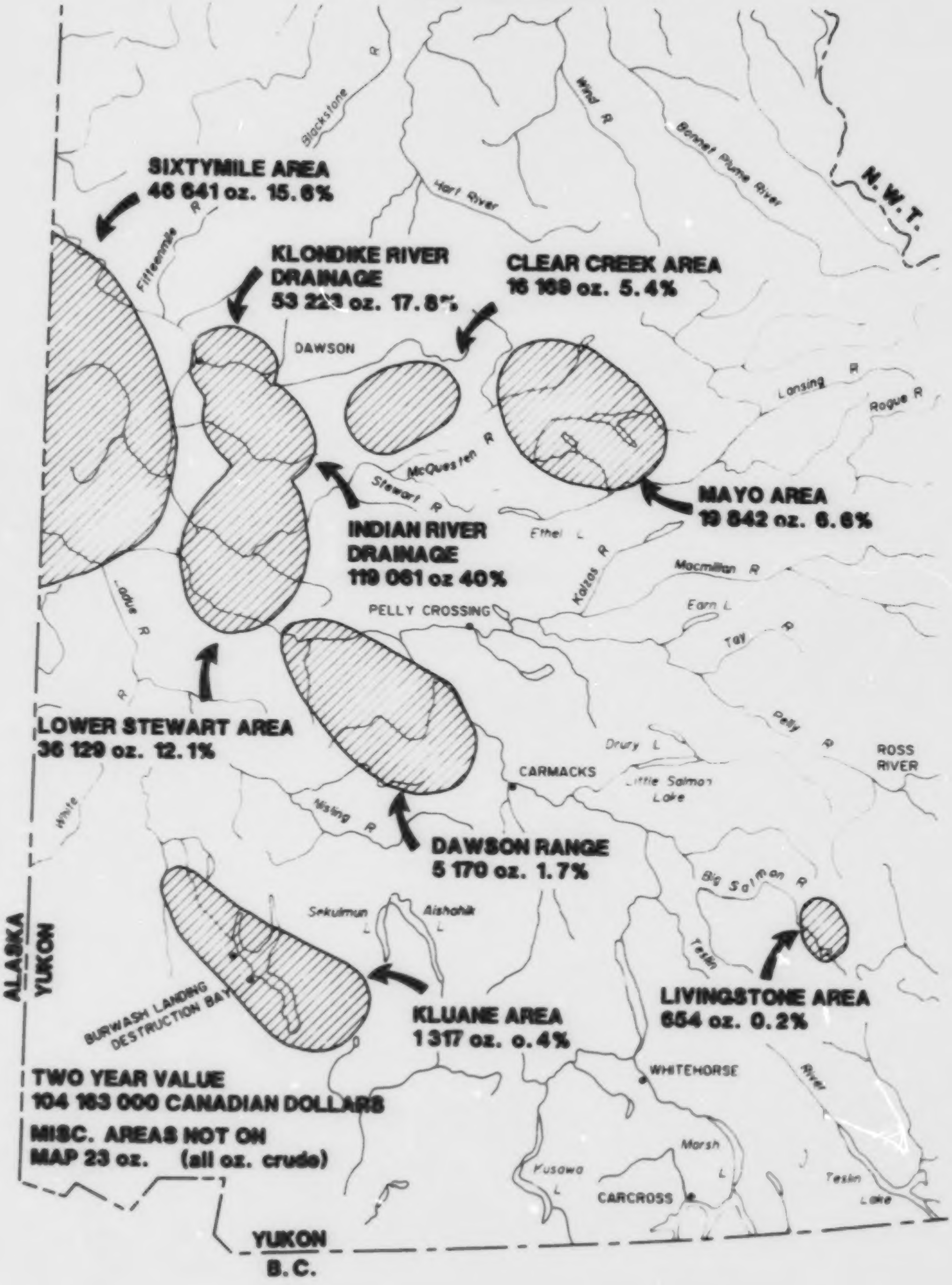
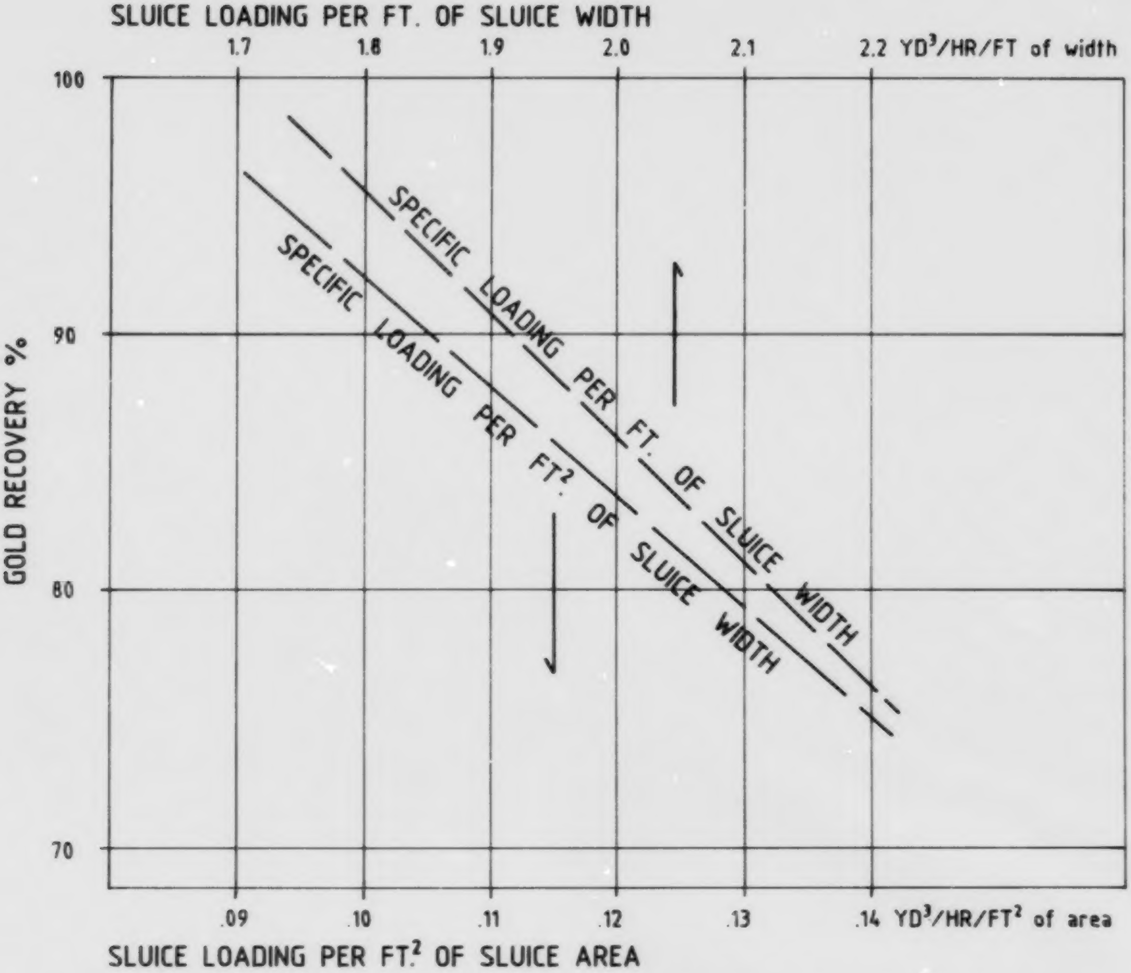
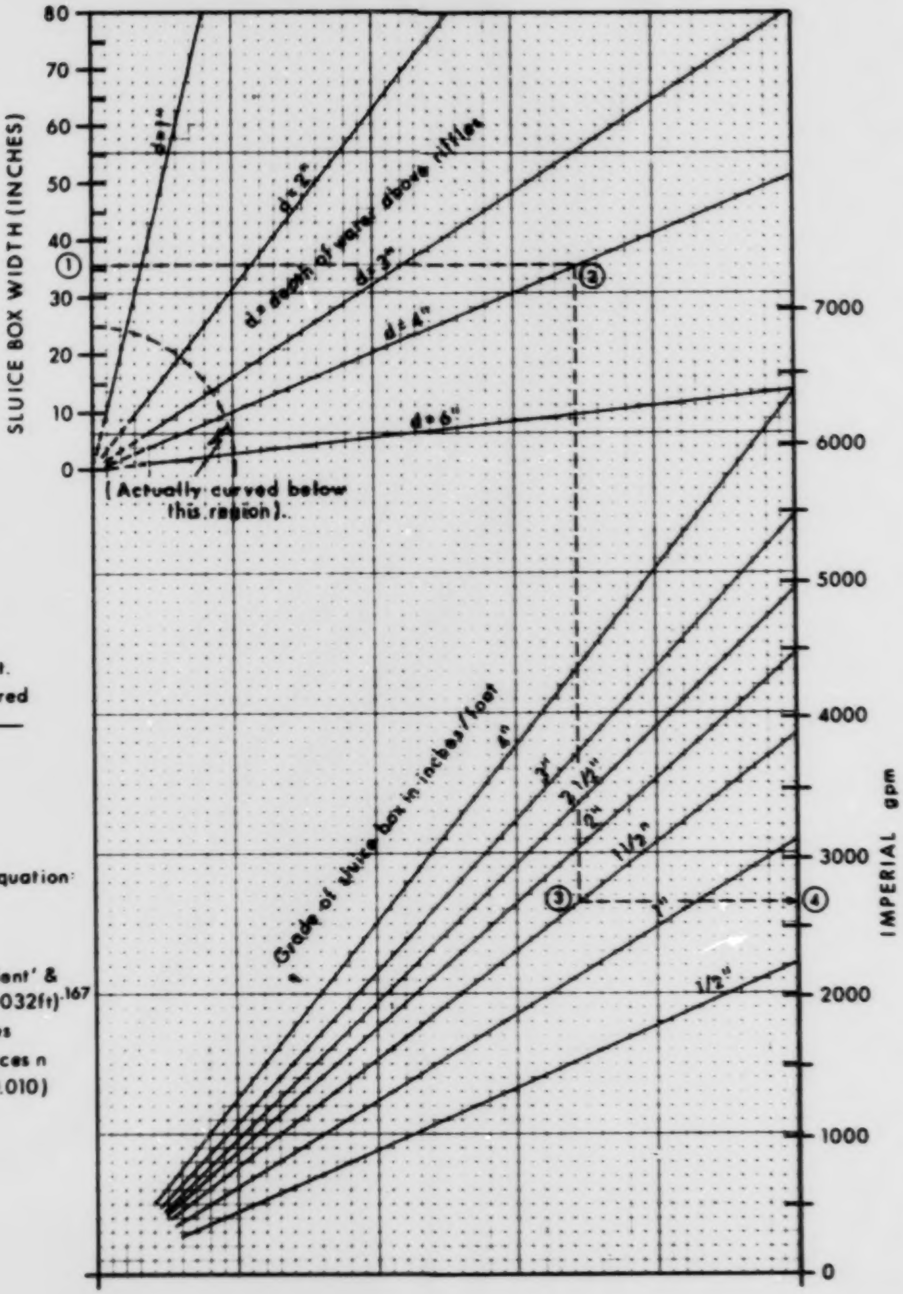
TWO YEAR YUKON PLACER PRODUCTION
1989 to 1990 Incl.
TOTAL 298 229 oz.


SIXTYMILE AREA
46 641 oz. 15.6%
KLONDIKE RIVER DRAINAGE
53 223 oz. 17.8%
CLEAR CREEK AREA
16 169 oz. 5.4%
MAYO AREA
19 842 oz. 6.6%
INDIAN RIVER DRAINAGE
119 061 oz 40%
LOWER STEWART AREA
36 129 oz. 12.1%
DAWSON RANGE
5 170 oz. 1.7%
KLUANE AREA
1 317 oz. o.4%
LIVINGSTONE AREA
654 oz. 0.2%
TWO YEAR VALUE
104 163 000 CANADIAN DOLLARS
MISC. AREAS NOT ON MAP 23 oz. (all oz. crude)
Blackstone R
Hart River
Wind R
Bonnet Plume River
N.W.T.
Fifteenmile R
DAWSON
McQuesten R
Stewart R
Lansing R
Rogue R
Ethel L
Kalzas R
Macmillan R
Earn L
Tay R
PELLY CROSSING
Ladue R
White R
Pelly R
ROSS RIVER
Drury L
CARMACKS
Little Salmon Lake
Nisling R
Big Salmon R
Sekulmun L
Aishihik L
Teslin
BURWASH LANDING
DESTRUCTION BAY
WHITEHORSE
River
Kusawa L
Marsh L
CARCROSS
Teslin Lake
ALASKA
YUKON
YUKON
B.C.



TYPICAL DETERIORATION IN SLUICE PERFORMANCE WITH INCREASED LOADING



eg.

1. box width 36"
2. water depth 4"
3. grade 1 1/2"/ft.
   Find water required
4. 2700 igpm ←

Based on Mannings Equation:

$$Q = \frac{1.5A}{n}(R)^{.67}(S)^{.5}$$

n = 'roughness coefficient' & given value of $(0.032\text{ft})^{.167}$ to allow for riffles (For smooth surfaces n would be about 0.010)

DETERMINATION OF SLUICE BOX FLOW

Modified from Alaska Dept. of Environmental Conservation booklet by R & M Consultants, Fairbanks, Alaska Jan. 83

NTS INDEX OF PLACER ACTIVITIES FOR ALL MAP SHEETS IN YUKON

MAP SHEET/CREEK	OPERATOR	NTS	LAT.	LONG.	Page
Laberge 105-E					
Livingstone Creek	Livingstone Placers Ltd.	105-E-8	61°20'N	134°15'W	2
Martin Creek	Gonder, D. Sr.	105-E-8	61°18'N	134°19'W	2
Little Violet Creek	Golden Violet Mining Ltd.	105-E-8	61°25'N	134°22'W	2
Dycer Creek	Pozum, C.	105-E-8	61°26'N	134°12'W	3
Mayo 105-M					
Empire Creek	Sabo, D.	105-M-5	63°28'N	135°36'W	4
Ledge Creek	Liske, B.	105-M-10	63°40'N	134°52'W	4
Ledge Creek	Moritz, H.	105-M-10	63°40'N	134°52'W	5
Anderson Creek	Wozniak, M.	105-M-11	63°43'N	135°02'W	5
Thunder Gulch	Bardusan Placers Ltd.	105-M-14	63°54'N	135°15'W	6
Davidson Creek	Dillman, H.	105-M-14 105-M-11	63°43'N	135°25'W	7
Duncan Creek	Duncan Creek Golddusters Ltd.	105-M-14	63°49'N	135°28'W	7
Duncan Creek	Sasha Mining Ltd.	105-M-14	63°52'N	135°14'W	8
Nash Creek 106-D					
Dublin Gulch	Dublin Gulch Mining Ltd.	106-D-4	64°03'N	135°51'W	9
15 Pup	Sharman, V.	106-D-4	63°58'N	135°52'W	9
Gill Gulch	Takas, T.	106-D-4	63°59'N	136°01'W	10
Kluane Area: Dezadeash- 115-A Mount St. Elias - 115-B&C Kluane Lake- 115-F&G					
Tatshenshini River	McPhail, R.	115-A-3	60°04'N	137°13'W	11
Kimberley Creek	Sawyer, C. & P.	115-B-16	60°52'N	138°04'W	11
4th July Creek	Churchill Placers Ltd.	115-G-1	61°11'N	138°05'W	12
12th July Creek	Churchill Placers Ltd.	115-G-1	61°10'N	138°04'W	12
Arch Creek	Leckie, O.	115-G-5	61°30'N	139°42'W	13
Burwash Creek	Dendys, A.	115-G-6	61°22'N	139°20'W	13
Quill Creek	Pfisterer, W.	115-G-6	61°29'N	139°25'W	13
Duke River	Bathues, R.	115-G-6	61°21'N	139°11'W	14
Reed Creek	Tremblay, L.	115-G-12	61°32'N	139°38'W	14
Carmacks 115-I					
Back Creek	Cochrane, F. & G.	115-I-3	62°04'N	137°04'W	16
Back Creek	Coghlin, J. & B.	115-I-3	61°04'N	137°07'W	16
Victoria Creek	D&H Placers	115-I-3	62°05'N	137°05'W	17
Klaza River	Tullis, T.	115-I-3	62°09'N	137°12'W	17
Klaza River	W.D.P. Placers	115-I-3	62°08'N	137°18'W	18
Guder Creek	Dodge, D.	115-I-6	62°18'N	137°11'W	18
Revenue Creek	Sikanni Oilfield Const. Ltd.	115-I-6	62°20'N	137°17'W	19
Hayes Creek	Wilson, G.	115-I-12	62°31'N	137°57'W	19
Snag 115-J&K					
Rude Creek	Fournier, A.	115-J-10	62°40'N	138°42'W	20
Ballarat Creek	Anderson, M.	115-J-14	62°59'N	139°07'W	20
Scroggie Creek/Marpiosa	Resore Industries Corp.	115-J-15 115-J-16	63°00'N	138°30'W	20

MAP SHEET/CREEK	OPERATOR	NTS	LAT.	LONG.	Page
Stewart River 115-N & O					
Kate Creek	Moosehorn Exploration	115-N-2	63°05'N	140°53'W	22
Swamp Creek	Canada Tungsten Mining	115-N-2	63°02'N	140°56'W	22
Matson Creek	Lode Resources	115-N-7	63°30'N	140°39'W	23
Sixty Mile River	Haner, L.	115-N-15	63°59'N	140°46'W	23
Sixty Mile River	Brisbois Bros. Const. Ltd.	115-N-15	63°59'N	140°47'W	24
Miller Creek	Klondike Underground Mining	115-N-15	63°59'N	140°48'W	24
Bedrock Creek	6803 Yukon Ltd.	115-N-15	63°58'N	140°51'W	25
Bedrock Creek	Stewart, J.	115-N-15	63°59'N	140°57'W	25
Barker Creek	Barker Creek Placer Exploration	115-0-2	63°05'N	138°56'W	26
Barker Creek	Burian, R.	115-0-2	63°07'N	138°55'W	26
Scroggie Creek	Bidrman, Z.	115-0-2	63°07'N	138°37'W	27
Kirkman Creek	Fell-Hawk Placers	115-0-3	63°01'N	139°15'W	27
Thistle Creek	Faith Mines	115-0-3	63°05'N	139°17'W	28
Sestak Creek	Trerice, B.	115-0-5	63°29'N	139°45'W	29
Sestak Creek	Midas Rex	115-0-5	63°29'N	139°45'W	29
Maisy May Creek	Queenstake Resources	115-0-6&7	63°21'N	139°00'W	29
Henderson Creek	Northway Mining & Exploration	115-0-6g	63°26'N	139°05'W	30
North Henderson Creek	Laurenson, D.	115-0-6h	63°28'N	139°13'W	30
Maisy May Creek	Jasper Equipment	115-0-7	63°19'N	138°57'W	31
Blackhills Creek	Paydirt Holdings (1982) Ltd.	115-0-7	63°29'N	138°52'W	31
Blackhills Creek	Queenstake Resources	115-0-7	63°27'N	138°50'W	32
Childs Gulch	Dorados Development Ltd.	115-0-7i 115-0-10c	63°30'N	138°50'W	32
Eureka Creek	Discovery Creek Gold Placers	115-0-10c	63°35'N	138°52'W	33
Montana Creek	Rivest Bros.	115-0-10d	63°38'N	138°59'W	33
Eureka Creek	Edgewater Exploration	115-0-10e	63°37'N	138°52'W	34
Indian River	Caribou Mines	115-0-10e	63°36'N	138°34'W	34
Dominion Creek	Airgold	115-0-10e	63°37'N	138°43'W	34
Dominion Creek	Queenstake Resources	115-0-10f	63°40'N	138°37'W	35
Lower Gold Run Creek	Teck Mining Group	115-0-10g	63°43'N	138°37'W	35
Dominion Creek	Ross Mining Services	115-0-10g	63°41'N	138°38'W	35
Dominion Creek	Consolidated Mines	115-0-10g	63°41'N	138°36'W	35
Sulphur Creek	Kruger, H.	115-0-10h	63°42'N	138°47'W	36
Brimstone Gulch (Sulphur Creek)	Groner, W.D.	115-0-10i	63°44'N	138°51'W	36
Rosebute Creek	Djukastein, T.	115-0-11	63°34'N	138°21'W	37
Indian River	Gold City Resources	115-0-11g	63°44'N	139°08'W	37
Indian River	Estabrook Mining	115-0-11g 115-0-14b	63°45'N	139°08'W	38
Indian River	Kodiak Gold	115-0-11g	63°44'N	138°09'W	38
Little Blanche Creek	Nafziger, I.	115-0-14	63°51'N	139°08'W	38
Hester Creek	Fritz, T.	115-0-14	63°59'N	139°03'W	38
Hunker Creek	Hilltop Mining Partnership	115-0-14	63°59'N	139°02'W	39
Upper Bear Creek	Russell Placers	115-0-14	63°59'N	139°15'W	39
Independence Creek	Kosuta, T.	115-0-14	63°59'N	139°01'W	39
Indian River	Zacharias, J.	115-0-14a	63°46'N	139°08'W	40
Little Blanche Creek	Miller H.	115-0-14a	63°51'N	139°08'W	40
Quartz Creek	Schmidt & Tatlow	115-0-14a	63°49'N	139°04'W	40
Indian River	Gold Valley Joint Ventures	115-0-14b	63°47'N	139°15'W	40
French Gulch (Eldorado Creek)	Reinink, H.	115-0-14e	63°55'N	139°19'W	41
French Gulch (Eldorado Creek)	Archibald, J.	115-0-14e	63°54'N	139°19'W	41
Eldorado Creek & 27 Gulch	Eldorado Mining	115-0-14e	63°53'N	139°18'W	42
Eldorado Creek & Oro Grande G.	Beron Placers Co. Ltd.	115-0-14e	63°52'N	139°18'W	42
Gay Gulch (Eldorado Creek)	Simpson, J. & M.	115-0-14e	63°53'N	139°15'W	42

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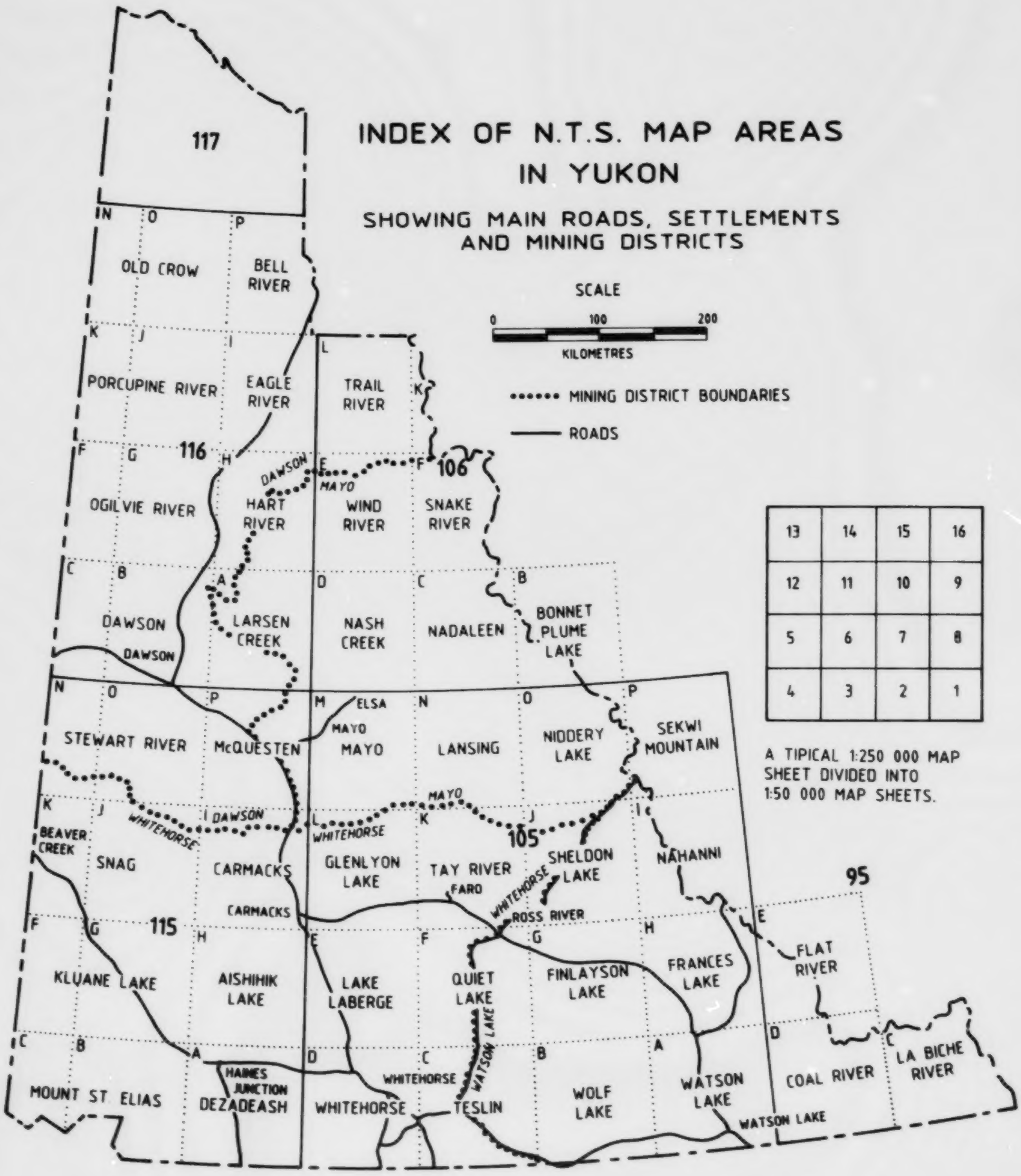

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YUKON PLACER INDUSTRY ACTIVITIES

Summaries of mining inspection reports

LIVINGSTONE CREEK 105 E 8
Livingstone Placers Ltd. 61°20'N 134°15'W
Water Licence: YPM89-104 1989, 1990

This property is located on Livingstone Creek, slightly downstream from the head of the canyon. Deposits consisted of top 10 feet of frozen gravel and 40 feet of sandy clay and boulders on bedrock. The crew consisted of three miners and a cook working one twelve hour shift.

A Terex D-800 bulldozer and an 8230 bulldozer (one on standby) were used to push pay to the Terex 72-51 loader which fed the derocker. A Terex 72-51 loader was used to haul tailings, which in turn were used to build roads as work progressed up the creek. One on-going cut was mined on the left limit bench at the head of the canyon, which has a width of 150 feet and progressing at a rate of 250 feet per year.

The wash plant consisted of a derocker, with a 10 foot vibrating deck powered by a 2 cylinder Detroit motor, and a 4 by 20 foot sluice run with 2 inch riffles and 8 feet of punch plate. The processing rate was 100 cubic yards per hour. Water was supplied from a ground water charged reservoir to the wash plant at a rate of 1500 igpm by a Cornel 8 by 10 inch pump, powered by a 1271 GMC diesel.

Effluent was treated in two small lakes downstream.

Gold recovered was between 2 and 16 mesh with the majority between 4 to 6 mesh. Fineness was reported as 880

Work continued in 1990 with one progressing cut mined using two settling ponds in the South Big Salmon. The processing rate was 150 cubic yards per hour using 1500 igpm. Water was supplied from an instream reservoir.

MARTIN CREEK 105 E 8
D. Gonder Sr. 61°18'N 134°19'W
Water Licence: YPM88-096 1989, 1990

This property is located on Martin Creek approximately 2000 feet upstream of its confluence with the South Big Salmon River. The gradient of the creek is steep. Deposits are 65 feet deep and thawed, with about 20 feet of glacial till and gravel on 30 feet of clay. This overlies 15 feet of pay gravels on bedrock. The crew consisted of three miners and one cook working two shifts. An area 500 feet by 60 to 100 feet was monitored in preparation for processing. Equipment on the property included a Cat D9 bulldozer and a Cat D7 bulldozer working with the monitor, and a Cat 966 loader working around the yard.

The wash plant consisted of a Derocker and a 4 by 20 foot sluice run with 2 1/2 inch riffles.

Water was supplied to the monitor by way of a gravity fed pipeline from two large reservoirs several hundred feet upstream from the operation. Effluent was settled in two downstream ponds before entering the South Big Salmon River.

Gold recovered was mostly minus 4 mesh with about 10% fine-grained and a fineness of 870.

No activity was reported in the 1990 season.

Aerial view looking upstream of D. Gonder's mining operation on Martin Creek.

LITTLE VIOLET CREEK 105 E 8
Golden Violet Mining Ltd. 61°25'N 134°22'W
Water Licence: YPM87-122RL 1990

In 1990 this property was worked by Mr. Gary Hudson (5813 Yukon Ltd) with the assistance of one helper.

A 125B excavator removed overburden and stockpiled pay gravels. A Cat 950 loader fed the processing plant with D8K bulldozer removing tailings. The Cat 931 loader was a stand-by machine.

The processing plant consisted of a Torgenson Vibrating Wet dump box screening down to two inch minus with a 40 foot x 24 inch single sluice run, the top 20 feet with hungarian riffles, the lower 20 feet with standard riffles. Ten to twelve feet of coarse glacial till plus two feet of decomposed bedrock were sluiced after 20 feet of sand and two inch minus gravel overburden had been removed.

The pay gravel was sluiced at an approximate rate of 35 yards an hour.

DYCER CREEK 105 E 8

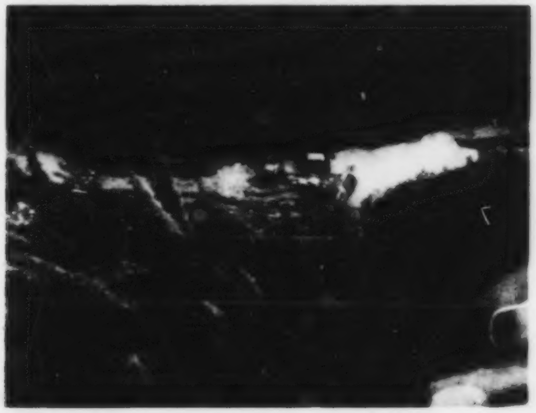
C. Pozum 61°26'N 134°12'W
Water Licence: YPM90-010 1990

A crew of seven directed by Mr. Wayne Tatman spent two weeks in August of 1990 excavating a small number of test pits on the left hand limit of Dycer Creek on TUK 17 and 18 claims.

The test pits revealed 3 feet of organic material, 18 inches of blue clay, 1 foot of sand and gravel, another foot of blue clay and 3 inches of sand. All material with the exception of the organics were sluiced using a 18" x 12' single run box with vibrating dump box and wet grizzly at a rate of 2 to 3 cubic yards an hour. A Cat D6 bulldozer, a Cat 931 loader and a Cat 977 loader were the heavy equipment used.

EMPIRE CREEK	**105 M 5**
D. Sabo	**63°28'N 135°36'W**
Water Licence: YPM88-002	**1989, 1990**

This property is located on Empire Creek. Mining continued 600 feet upstream from last years workings on the left fork (i.e. approximately 2500 feet upstream of the junction between the left and right forks). The valley is only 35 feet wide with a very steep gradient at this point. Deposits consist of 6 feet of large boulders up to 5 feet in diameter mixed with clay and coarse gravel. Bedrock is schist and shale in various stages of decomposition. Quartz veins (i.e. reefs) occur across the valley. Overburden consists of a small amount of organic material and bedrock that has slid off the side hills. The gravel and 3 feet of bedrock are sluiced. The total width of the valley is mined. Gold distribution is irregular with concentrations occurring around bedrock reefs.



Aerial view of D. Sabo's operation on Empire Creek.

Dan Sabo worked alone for about 12 hours per day.

A D65A Komatsu bulldozer was used for stripping and removing tailings. A H65C Hough rubber tired loader with a 3 yard bucket was used to feed the sluice box. An Hitachi UHO81 excavator with a 1 yard bucket was used for stripping and to move pipe.

The wash plant consisted of a dump box and wet grizzly 14 feet long by 10 feet wide and a single run sluice 11 feet long and 21 inches wide. Four feet of grader blade lined the throat of the dump box. The sluice box is lined with 3 inch Hungarian riffles at 3 inch spacings over Coco matting. The grade of the box is 2 inches per foot. The processing rate is about 30 cubic yards per hour.

Two adjoining cuts were mined in 1990 for a total of 3200 cubic yards sluiced and 6400 cubic yards stripped. Overburden and tailings are pushed downstream and used to build a road along the right limit of the creek over mined out ground.

Water was recycled to the spray bar from a pond at the end of the sluice box. A 4 inch Monarch pump powered by a twin cylinder diesel Onan accomplished this task. Total creek flow is diverted around the cut and to the wash plant by gravity through 250 feet of 36 inch diameter riveted steel pipe. The pipe discharges into a manifold which separates the flow into two 6 inch victrolick pipes which supply the spray bar. When not sluicing or when excess flow exists, the overflow discharges from the manifold into the creek below the wash plant. Water was in short supply for most of the year 1990. The pipe and the washplant were moved upstream when the mine cut reached the supply end of the pipe.

The gold is coarse grained and has a fineness of 910.

Looking downstream at D. Sabo's operation on Empire Creek.

LEDGE CREEK	**105 M 10**
B. Liske	**63°40'N 134°52'W**
Water Licence: YPM88-106	**1989, 1990**

This property is located on Ledge Creek about 3/4 of a mile above Mayo Lake. Although the creek valley widens at this point, the gradient is still quite steep. The material mined was contained in a bedrock depression and consisted of 7 to 8 feet of channel gravels overlain by 6 feet of old tailings. The area had been worked previously and was not frozen.

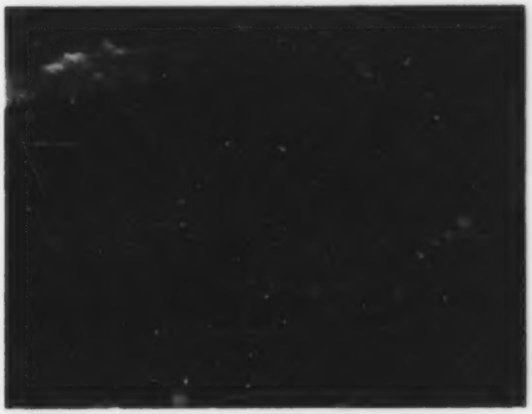
Two miners worked part time in 1989 sluicing a total of 500 cubic yards.

An Fiat Allis HD5 dozer was used to feed the wash plant and remove tailings.

The sluice box consisted of 2 runs lined with punch plate. Material was processed at a rate of 2 1/2 cubic yards per hour by filling the 12 cubic yard dump box and monitoring the material through the box. A small jig was used for clean ups.

Water was supplied via an 18 inch diameter gravity fed steel pipeline at a rate of 1000 igpm. A large capacity, out-of-stream pond received effluent from the wash plant. The pond has no visible discharge to Mayo Lake.

The gold is primarily coarse grained and has a fineness between 805 and 825.



This photo shows a thick gravel deposit which is mined by B. Liske on Ledge Creek.

LEDGE CREEK 105 M 10
H. Moritz 63°40'N 134°52'W
Water Licence: YPM88-106 1989, 1990

This operation was mining under B. Liske's water licence. This property is located on Ledge Creek about .75 miles above Mayo Lake. The creek gradient is very steep at this point. Deposits at the site consist of slide rock mixed with post-glacial muck, silt, clay and gravel at the apex of the Ledge Creek delta. The mixture of rounded and angular material suggests deposit by a slide event possibly associated with the glacial retreat. The deposits are up to 55 feet thick, and are not frozen. Bedrock is soft schist with some quartz stringers. All of the material and 1 foot of bedrock were sluiced. Overburden had been stripped off prior to 1990. Two cuts totalling 18,500 and 17,000 cubic yards were mined in 1990 and 1989 respectively.

The crew consisted of Horst and Shelly Moritz working a single shift. The property owner, Bert Liske, was also on site for most of the season in 1990.

A Cat D7E bulldozer was used to break up pay ground and remove fine tailings. A Massey Ferguson 66 rubber tire loader was used to feed the wash plant and remove coarse tailings. Overburden and tailings were deposited on the valley sides.

The washplant consists of a dump box 15 feet long by 6 feet wide, a grizzly and a single run sluice 26 inches wide and 24 feet long. The grizzly bars were placed horizontally at 4 inch spacing. Low water required modifications to the grizzly consisting of placing drill rod vertically 5 inches apart on top of the horizontal bars. The sluice is lined with 2 by 2 inch hungarian riffles spaced 2 inches apart on top of coco matting. The grade on the box is 1.75 inches to the foot. The processing rate is 40 cubic yards per hour.

Water was supplied by gravity through a 500 feet long, 18 inch diameter riveted steel pipe from a small instream reservoir. A plywood gate controlled the flow by dropping the water level below the pipe level when not sluicing. Effluent was treated in a large 150 by 400 yard out-of-stream pond. This pond discharged essentially clean water by seepage into a marshy area. There is no direct discharge into Mayo Lake.

About 75% of the gold is coarse (pea and rice size). The fineness is between 805 and 820.

ANDERSON CREEK 105 M 11
Manfred Wozniak 63°43'N 135°02'W
Water Licence: YPM88-071 1989, 1990

This operation is located on the lower portion of Anderson Creek where the creek changes gradient and flows over an alluvial fan. The fan deposits have been altered by glaciation and layers of fine material (i.e. clay) are found at various levels in the fan. Mining in 1989 and 1990 occurred toward the top end of the alluvial fan on claim P5911. The ground was frozen and averaged 50 feet deep including 4 feet of glacial till including fines and organic material, 20 feet of oxidized red gravel, a 4 feet layer of clay, an additional 20 feet of red gravel and 2 feet of bedrock. Both the 20 feet sections of gravel and 2 feet of bedrock were sluiced.

Manfred Wozniak worked alone for about 12 hours per day in 1989 and part time in 1990.

A Cat D7 bulldozer with straight blade was used to strip, push up pay and rip bedrock. A Trojan rubber tired loader with a 1 1/2 yard bucket was used to feed the plant and stack the tailings.

A 10 feet long by 4 feet wide dump box was fitted with a dry grizzly with horizontal bars spaced 8 inches apart. Material smaller than 3/4 inch passed through punch plate in the hopper and travelled over a single run sluice, 20 feet long by 3 feet wide. The sluice run was lined with hungarian riffles and nomad matting. The processing rate was 8 cubic yards per hour.

In 1989, one cut was mined for a total of 6,000 cubic yards sluiced and 1,660 cubic yards stripped. Overburden and tailings were stacked in the valley and the tops flattened. Production in 1990 was unavailable.

A small diversion ditch supplied water at a rate of 500 to 1000 igpm to the wash plant. Water was very low in 1989. A series of 3 ponds treated the effluent.

The gold is coarse grained, red in colour and occurs with a great deal of black sand.

THUNDER GULCH	**105 M 14**
Bardusan Placers Ltd	**63°54'N 135°15'W**
Water Licence: YPM89-174	**1989, 1990**

This property is located on Thunder Gulch. Mining in 1989 and 1990 took place on Thunder Gulch upstream of the junction with Tundra Pup. A downstream cut was also taken from the lower portion of Thunder Gulch about 0.5 miles upstream of Lightning Creek.

Thunder Gulch is narrow with a very steep gradient. Deposits are about 90 feet deep and consist of 30 feet of slide material (including bedrock), 15 feet of glacial till with boulders up to 3 feet in diameter, and 45 feet of poorly sorted angular stream gravels. Bedrock on the upstream cut was thick and thinly bedded Keno Hill quartzite. This bedrock dipped upstream and across the valley towards the southwest. Bedrock on the downstream cut was poorly fractured, massive greenstone (chlorotic schist) and Keno Hill quartzite. The ground was not frozen. The stream gravel and 2 feet of quartzite bedrock were sluiced. It was necessary to take up to 6 feet of the greenstone bedrock because the gold penetrated it to a greater depth.

In 1989, 27,500 cubic yards were stripped from the upstream cut and 7,400 cubic yards from the downstream cut. A total of 38,000 cubic yards were sluiced. In 1990, approximately 23,500 cubic yards were stripped and 21,400 cubic yards sluiced from the upstream cut. The downstream cut made in 1989 was widened to include a low level bench. About 18,000 cubic yards were sluiced from the downstream cut. No stripping was done in this area. Tailings and overburden were packed up hill and stacked on the valley sides and in old cuts.

The crew consisted of a helper and 3 miners working a 10 hour shift.

A Cat D7 bulldozer with straight blade was used to strip overburden. A Cat 988 loader with a 7 yard bucket was used to feed the Derocker. A Cat 980 loader with a 5.5 yard bucket was used to remove tailings.

The wash plant consisted of a derocker and a 17 feet long sluice run with undercurrent. The derocker was powered by a 21 HP Lister diesel. The upper run was lined with flat riffles spaced 2.5 inches apart over expanded metal and Coco matting. The first 12 feet of the upper run also had punch plate with 3/8 inch holes. Material passing through the punch plate went into the lower run and travelled over expanded metal and Coco matting. The grade on the sluice box was 1.5 inches per foot. The processing rate was 70 to 100 cubic yards per hour. A long tom was used for clean up. Amalgamation is sometimes used on the fine gold.

Water was supplied to the wash plant by gravity through a 12 inch diameter pipe equipped with a plywood control gate and a screen. A small instream reservoir supplied water to the pipe. The pipe length varied from 20 to 160 feet depending on the location of the sluice box. A shortage of water on Tundra Pup made it necessary to move downstream and mine at the lower end of Thunder Gulch for part of the 1990 season. The effluent was treated in a series of out-of-stream ponds located in the Lightning Creek valley. Each pond is about 200 feet long by 100 feet wide. A new pond was partially built but not used. The level of the old ponds was increased by raising the level of the wooden spillways.

The gold was very rough, angular with quartz attached. Twenty percent was larger than 4 mesh, 20% was 4 to 6 mesh, 10% was 6 to 10 mesh and 50% was less than 10 mesh in size. The fineness was 823. Large amounts of galena cubes were commonly found in the concentrate. Hematite and magnetite were also present. Gold values were concentrated close to bedrock.

DAVIDSON CREEK 105 M 14 & 11
Henry Dillman 63°43'N 135°25'W
Water Licence: YPM89-043 1990

This operation is mined under Robert Wonga's water licence. This property is located on Davidson Creek 1.5 miles upstream from the Mayo River. Four cuts were mined in 1990 starting at the mouth of the canyon and working upstream. The valley narrows at this point with very little room to bypass the creek around the cut. The creek bottom is mined rim to rim. The deposit consists of 1 foot of organic material and 16 feet of gravel mixed with schist slide rock off the side hills. The ground is not frozen. The gravel and bedrock are sluiced. Bedrock is excavated and sluiced until hard bedrock is encountered. Hard quartzite bedrock was encountered on the right limit and soft decomposed schist on the left limit. A total of 100,000 cubic yards were sluiced in 1990. The small amount of organic material stripped was pushed up the side hill.

Four miners and 1 cook worked a 12 hour shift.

A Komatsu 455 bulldozer was used to strip ground and push up pay. A Cat 235 excavator with a 2.2 yard bucket was used to feed the wash plant. A Cat 988 Loader with a 7 yard bucket was used to remove tailings.

A 6 feet wide by 22 feet long #6 super (finger) sluice fed material to a single run sluice 3 feet wide by 20 feet long. The sluice was lined with angle iron riffles over expanded metal and Nomad matting. The processing rate was 80 cubic yards per hour.

Water was pumped out of Davidson Creek by a Fairbanks Moorse 6 by 8 inch pump powered by a Duetz 125HP motor. The pump supplied water to the spray bar on the derocker at a rate of 500 igpm.

The total flow of Davidson Creek was treated in a 600 by 300 feet by 2 feet deep out-of-stream settling pond. This proved problematic in the fall when high flows were experienced. The high flows also threatened to wash out equipment in the canyon.

The fineness of the gold was 838 with a mixture of sizes and shapes. A third of the gold is between 10 and 30 mesh, a third larger than 10 mesh and a third smaller than 30 mesh.

DUNCAN CREEK 105 M 14
Duncan Creek Golddusters Ltd. 63°49'N 135°28'W
Water Licence: YPM86-138R 1989, 1990

This property is located on the Duncan Creek, approximately 3 miles from its confluence with the Mayo River. Mining proceeded upstream from the last cut made in 1988 on the left limit but switched to the right limit as bedrock dropped off rapidly and drainage to the cut was lost. Deposits consisted of 2 feet of frozen organic black muck, 1 to 2 feet of sand and medium sized gravel, 25 feet of pay gravel with boulders up to 3 feet in diameter and intermittent bands of frozen muck. Bedrock is schist and decomposed Keno Hill quartzite.

During 1989 there were 7 and occasionally 8 miners employed at this operation. Two 11 hour shifts were worked each day. The black muck was stripped 2 to 3 years in advance using a Cat D8H bulldozer and hydraulic stripping using total creek flow in the spring. In 1989 100,000 cubic yards were stripped mechanically and 15,000 cubic yards were stripped hydraulically. The sluice plant was moved upstream as mining progressed. About 45,000 cubic yards, consisting of 15 feet of gravel and 1 foot of bedrock, were sluiced in 1989. An Hitachi UH30 tracked excavator with a 4.5 yard bucket feeds the sluice plant. The excavator is also used for ditching and stripping. Tailings are removed by a Cat 988 Loader with a 7 yard bucket. The loader is also used for stripping. A 17 yard Volvo 5350 rock truck was used to haul overburden, tailings and move equipment. Tailings are used to berm up the effluent drain functions and for road building.

In 1990 approximately 80,000 cubic yards were sluiced and a total of 10 people made up the operation, 8 of whom were miners working 2 shifts. The creek was used to remove 6,000 to 8,000 cubic yards with 120,000 cubic yards being mechanically stripped.

The wash plant consisted of a 10 by 12 foot dump box, wet grizzly and a three run sluice box. The centre run was 3 feet wide and consisted of 6 feet of slotted punch plate, followed by 10 feet of Hungarian riffles. The two side runs were 16 feet long and 3 feet wide and was lined with 1 by 2 inch expanded metal over nomad matting. Material less than 5 1/2 inches in size fell through the grizzly and passed over the centre run. Material smaller than 5/8 inch passed through slotted punch plate in the centre run and travelled through the side runs. The processing rate varied from 120 to 160 loose cubic yards per hour.

A small jig and longtom measuring 3.5 feet by 6 feet was used to clean the concentrate from the sluice box. The gold is then processed into dory bars on site.

Water flows through coarse tailings in a berm separating the creek from the effluent drain. Water is pumped out of a pond at a rate of 2600 igpm. The diversion channel is equipped with a culvert and hand operated gate. A Gorman-Rupp 10 by 10 inch slurry pump powered by a Cat 3306 engine supplies water to the sluice box and spray bar. Effluent is treated in two out-of-stream settling ponds located about 1 mile downstream of the wash plant.

The gold is pounded flat. Approximately 7% is larger than 10 mesh, 60% is between 10 and 25 mesh, 28% is between 25 and 70 mesh and the remaining 5% is less than 70 mesh in size. The fineness ranges from 785 to 790. Garnets and hematite are found in the concentrate.

DUNCAN CREEK	**105 M 14**
Sasha Mining Ltd.	**63°52'N 135°14'W**
Water Licence: YPM90-027	**1989, 1990**

This operation is located on Duncan Creek, upstream and downstream of Williams Creek. The valley is relatively wide with a moderate gradient. This is the third season of preparation at this site. Work to date consists of stripping, excavating bypass channels for Duncan Creek and Williams Creek, digging a bedrock drain and constructing settling ponds. In addition equipment was repaired and a wash plant fabricated.

Four miners worked a 12 hour shift.

A Cat D9H bulldozer with U blade and ripper and a Michigan 275 loader with a 6 yard bucket were used for stripping, ditching and pond construction. A Marion 111 drag line with a 4 yard bucket was used to excavate the bedrock drain.

The wash plant consists of a 14 feet wide x 4 feet deep x 4 feet long wet hopper feeding a 9 feet diameter x 26 feet long trommel. Two inch minus material passes through the trommel into a sluice run 9 feet wide by 9 feet long lined with 2 inch hungarian riffles spaced 3 inches apart. This run feeds two reverse runs 4 feet wide by 20 feet long lined with expanded metal over astro turf. A 50 HP electric motor drives the trommel. A 50 KW Duetz generator supplies power to the motor.

Water will be supplied to the wash plant by a 8 x 10 inch Cornell pump powered by a 671 Detroit diesel and two 30 HP electric submersible pumps powered by a 50 KW International generator.

Approximately 180,000 cubic yards of overburden were stripped off 5 claims in 1988 and 1989. Approximately 15,000 cubic yards were excavated out of the bypass channel for Duncan Creek (approximately 2500 feet long) and an additional 70,000 cubic yards from the bedrock drain (approximately 2000 feet long x 25 feet deep).

Pay gravels were not reached so no sluicing took place in 1990.

DUBLIN GULCH 106 D 4
Dublin Gulch Mining Ltd 64°03'N 135°51'W
Water Licence: YPM88-001 1989, 1990

This property is located on Dublin Gulch, 1 mile upstream of Haggart Creek. Two cuts were mined in 1990. The first cut continued upstream from where mining finished in 1989. The second cut was taken out of deep ground on the left limit of Dublin Gulch, about 1/3 of a mile upstream from Haggart Creek. The upstream deposits consisted of 8 feet of glacial overburden ranging in size from silt to boulder and 12 feet of stream gravels and boulders. Bedrock was decomposed bedded quartzite. The pay contained large boulders. The stream gravels and some bedrock were processed. The downstream cut was an average of 80 feet deep. Seventy feet of sand, silt and fine gravel overlay 6 feet of old channel gravels. The old channel and 4 feet of bedrock were sluiced.

The crew consisted of 8 miners and one cook. Two 8.5 hour shifts were worked.

Two Cat D9H bulldozers with U blades and rippers were used to strip overburden and push pay. A Cat 988B loader with a 7 yard bucket and a Cat 988 loader with a 6 yard bucket was used to stack tailings. A Cat 966 loader with a 3 yard bucket were used to load the box. A Hitachi 172 excavator with a 2 yard bucket was used in the cut for drainage ditches and to clean bedrock. The excavator was also used for stripping.

Two wash plants were used in 1990. A derocker fed a 24 foot long by 31 inch wide double run sluice. The main run processed 2 to .5 inch sized material and was lined with 3 feet of .5 inch punch plate and 15 feet of 2 .5 inch Hungarian riffles over expanded metal and astro turf. The undercurrent was also lined with expanded metal and astro turf.

The second wash plant consisted of a wet hopper, 7 feet diameter by 40 feet long trommel and a 10 feet long triple run sluice. The trommel screened the material to 2 inch minus. The 2 to .5 inch material was processed by the centre run lined with angle iron riffles over expanded metal and matting. Material smaller than .5 inch passed through punch plate and into the two side runs lined with expanded metal and nomad matting.

Approximately 38,000 cubic yards were sluiced in 1989 (30,000 from the upstream cut and 8,000 from the downstream cut). A total of about 65,000 cubic yards were stripped including preparation work for 1990. A total of 163,000 cubic yards of material were stripped and 54,000 cubic yards of material sluiced in 1990. Tailings and overburden were pushed into old upstream cuts. Overburden on the downstream cut was pushed into the centre of the valley.

Water was supplied to the upstream cut via a 12 inch diameter 300 foot long gravity fed steel pipeline from a medium sized instream reservoir. An 8 x 10 inch pump was used to recycle water from a small pond to the wash plant on the downstream cut. Water was in short supply for the last half of the 1990 season. Two large settling ponds in the Haggart Creek Valley were used to treat the effluent.

Thirty percent of the gold was larger than 10 mesh including 5% nuggets up to 1 ounce in size. The fineness was 870. Concentrates contained Wolframite, Hematite, Bismuth, Jamesonite and Scheelite in quantities of 1/2 lb. per cubic yard.

15 PUP 106 D 4
Victor Sharman 63°58'N 135°52'W
Water Licence: YPM89-065 1989, 1990

This property is located on 15 Pup about .5 miles upstream of its junction with Haggart Creek. The valley is relatively narrow with a moderate gradient. Deposits are frozen and consist of 10 feet of black muck on top of 30 feet of post glacial gravel. The gravel with some bedrock was sluiced. Overburden was thawed by the sun and pushed up the side hill.

The crew included Vic Sharman and his wife working one 12 hour shift.

A Cat D5 bulldozer was used for stripping and removing tailings. A Kawasaki 55Z loader was used for feeding the box. A Case 789 backhoe was used for ditching.

The wash plant consisted of a spring mounted grizzly with 1.5 inch pipe at 3 inch spacing over top of a 12 by 10 foot wet hopper. One half inch punch plate in the throat of the hopper fed material to an undercurrent of expanded metal over nomad matting. One half to three inch material passed over a double run sluice. Each run measured 2 feet wide by 20 feet long lined with angle iron riffles and nomad matting under expanded metal.

Water was taken from an instream reservoir and fed by gravity to the wash plant. Water was in short supply for part of the 1989 season and forced the operator to shut down for a period of time. Effluent was treated in a series of out-of-stream ponds in the Haggart Creek valley.

GILL GULCH	**106 D 4**
T. Takas	**63°59'N 136°01'W**
Water Licence: YPM89-128	**1989, 1990**

This operation is located at the mouth of Gill Gulch in the Haggart Creek valley. Cuts were mined in the face of a bench in the centre of the Gulch. The deposit was followed for a short distance upstream on Gill Gulch. The ground was frozen in patches and consisted of 1 foot of organic material, 34 feet of stream gravel and decomposed schist bedrock with quartz riffles. Approximately 9 feet of gravel and 1 foot of bedrock were sluiced.

In 1990, 23,750 cubic yards sluiced and 47,500 cubic yards were stripped. The crew was made up of 3 miners working a 12 hour shift.

A D8H Cat bulldozer with an angle blade was used to strip overburden and push up pay. Overburden was frozen up to 8 feet deep in places and had to be ripped. A Volvo loader with a 4 yard bucket was used to feed the plant. A Cat 977 loader with a 3 yard bucket was used to remove tailings. A Michigan 175 loader with a 3 yard bucket was also used to feed the plant and remove tailings. Tailings were used to build up the settling pond dam. In 1990 the equipment was upgraded to a Hough 80 loader with a 4 yard bucket and a Hough 90 loader with a 5 yard bucket used to feed the sluice box.

The wash plant consisted of a 5 yard hopper feeding a 5 feet diameter x 20 feet long trommel and a short double run sluice lined with 2.5 inch hungarian riffles over astro turf matting.

A Volvo 6 x 6 inch pump supplied water from Haggart Creek to the trommel at a rate of 1000 igpm. Effluent was treated in a large out-of-stream pond which discharged into Haggart Creek.

The gold was oxidized and fine grained with some small nuggets. The fineness was 870.

Tatshenshini River	**115 A 3**
Rod McPhail	**60°04'N 137°13'W**
Water Licence: YPM88-124	**1989, 1990**

This property is located on the right limit bank of the Tatshenshini River, approximately 2 kilometres south of the Takhanne River Bridge. The deposit consisted of 20 to 30 feet of mixed gravels to bedrock. Rod worked alone. A P & H 312 3/4 cubic yard Hoe was used for feeding his wash plant and a Cat D6 bulldozer was used to strip and push up pay gravels.

The wash plant processed 4 to 5 cubic yards per hour. It consisted of a feeder hopper, a 30 inch diameter by 12 foot long trommel which classifies 1/2 inch minus materials, and a sluice run which is 18 inches wide by 10 feet long. The trommel is powered by a Briggs and Stratten 3 HP Motor. Water was supplied to the wash plant by way of a recycling pond.

In 1990 a 175A loader was used for tailing removal and clean-up. Drilling and blasting a layer of cemented conglomerate became necessary.

Aerial view looking upstream of Rod McPhail's mining operation on right limit river gravels, Tatshenshini River.

KIMBERLY CREEK	**115 B 16**
C. & P. Sawyer	**60°52'N 138°04'W**
Water Licence: YPM87-155R	**1989 1990**

This property is located on Kimberly Creek, a tributary of the Jarvis River. The deposit consisted of 4 feet of thawed gravel on bedrock. All the gravel section and 2 feet of bedrock were processed.

Two miners working a single shift used a Cat D6 bulldozer to stockpile pay, remove tailings and push gravel to the Drott Cruz-Air 40 rubber-tired hoe which fed the plant. A skid-mounted wobble feeder was used to process the gravels.

This wash plant has a small wash box with spray bar. The material moves over 5 chain-driven elliptical shafts which screen the material to minus 1 inch. The gravels drop down to a second wash deck which separates and moves 3/8 inch material to the sluice run and minus 3/8 inch to a jig. The wobble feeder was powered by a 9 HP Hatz diesel. The sluice run was 1 foot wide by 5 feet long with a nugget trap. Water was supplied from an instream reservoir by a 4 by 5 inch Allis Chalmers pump at 300 igpm.

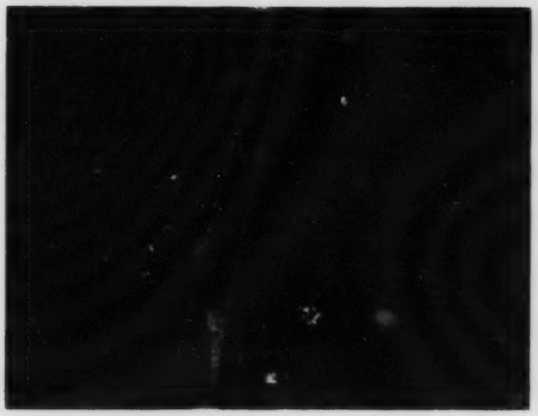
Tailings were stacked along the creek right limit and effluent was treated in an out-of-stream settling pond. One 300 by 60 foot cut was mined in 1989, processed at about 25 cubic yards per hour.

The operation site moved to the left hand limit of Kimberley Creek in 1990 with an increase in gravel depth to 10 feet over two feet of mixed clay and gravel on bedrock, all of which was sluiced. Three cuts were mined at a rate of approximately 15 cubic yards an hour.

An innovative sluice plant designed by C. Sawyer on Kimberley Creek.

4TH OF JULY CREEK 115 G 1
Churchill Placers Ltd, 61°11'N 138°05'W
T. Churchill, 1989
Water Licence: YPM88-034

Sikanni Oilfield Construction Ltd. mined this property under Tom Churchill's water licence. The property is located on the 4th of July Creek extending a distance of greater than 2 miles below the left limit tributary of the 12th of July Creek to above the left limit tributary of Snyder Creek. Deposits consisted of less than one foot of organics overlying ten to twenty feet of unfrozen gravels on a false bedrock layer (glacial boulder clay).



View of Sikanni Oilfield Construction mining on Larose Creek tributary to 4th of July Creek.

Work at the property in 1989 was done by Churchill Placers Ltd and Sikanni Oilfield Construction Ltd, Equipment included a 235 hoe that fed the plant, a Cat D8H removed the tailings, a Cat D6 for camp use and stand-by, and an International 3850 loader for settling pond and road maintenance. A total crew of four worked a double shift.

The wash plant consisted of a 44 by 6 foot diameter trommel, turning at 11 RPM and driven by a 30 HP electric motor powered by a 150 Kw Cat generator and a 3406 Cat diesel. The trommel was made up of a 20 foot scrub section followed by four feet of 1/2 inch slots, a 10 foot scrub section, 10 feet of 1/2 inch slots and a section of 3/4 inch and 1 inch crusher screen. Undersized material goes to a bank of six centrifugal drums turning at 150 RPM, two at 20 inch diameter and 8 feet long, and four at 14 inch diameter by 8 feet long.

This photo shows a trommel wash plant with centrifugal drums at Sikanni Oilfield Construction operation on 4th of July Creek.

Water was supplied from a sump, charged by seepage via a 6 inch Flyght electrical submersible, to the trommel at the rate of 1200 igpm. The total section of the 2000 by 30 by 20 foot deep cut was sluiced for a total of 50,000 cubic yards processed in 1989 at about 100 cubic yards per hour.

Churchill Placers Ltd continued the same operation in 1989. Gold was generally flat and rough-edged with occasional quartz. Ninety-five percent was smaller than 14 mesh and fineness averaged 810.

12TH OF JULY CREEK 115 G 1
Churchill Placers Ltd, 61°10'N 138°04'W
Water Licence: YPM88-034 1989, 1990

Triple Gold Ltd. mined this property under Churchill Placer's water licence. The operation was located on the 12th of July Creek.

The claims are owned by Mr. T. Churchill and leased to Triple Gold Ltd. This was the first season on the property for Triple Gold.

The deposit consisted of less than one foot of organics overlaying ten to twenty feet of unfrozen gravels on bedrock.

The crew consisted of five miners and one cook.

Heavy equipment included a Cat D9H bulldozer and a Cat 980B loader was used to work the cut and feed pay to the loader. The loader fed the plant and remove tailings.

The wash plant consisted of a derocker with a four foot wide by twenty foot long sluice run. Washed material leaving the sluice run was screened to minus 2 inches on the metal deck prior to entering the single run box.

The washing rate was approximately 80 to 100 loose cubic yards per hour. Sluice water was pumped by 6 by 6 inch pump powered by a four cylinder diesel engine. The entire gravel section was sluiced.

The camp and equipment marshalled at the confluence of 4th and 12th of July Creeks were removed from the area.

Mr. Churchill did some limited testing with backhoe and pan in 1990 season.

Gold was reported to be 810 fine.

ARCH CREEK **115 G 5**
O. Leckie **61°30'N 139°42'W**
Water Licence: YPM88-080 **1989, 1990**

This property is located on Arch Creek, a tributary of the Donjek River. The main creek channel deposit is thawed gravels 20 to 25 feet deep on competent bedrock. Bench deposits are frozen.

Sluicing plant at O. Leckie's operation on Arch Creek.

Heavy equipment included a Cat D6C bulldozer which was used to strip overburden on the bench and stockpile pay gravel. A Cat 920 loader was used to feed the sluice box. Material was dumped through a 2 inch mesh grizzly into a 6 by 12 foot wash box, followed by a 26 foot long twin run sluice. The 14 inch wide run handled coarse material and a 24 inch wide run handled finer material. Water was supplied from an instream reservoir to the wash plant by a 6 by 6 inch pump powered by a 635 Perkins diesel at 450 igpm. The processing rate was 25 cubic yards per hour. All tailings were to be stockpiled, recontoured and levelled after mining operations were completed. Effluent was treated in two out-of-stream ponds.

Gold was reported as 30% fine-grained and 70% coarse grained fineness of 870.

Little activity took place in 1990 with Mr. Leckie being on site for only a few weeks.

BURWASH CREEK **115 G 6**
A. Dendys **61°22'N 139°20'W**
Licence PM89-173 **1990**

This property is located immediately upstream of the canyon. Mr. Gordon Hagen and one assistant used a Cat D7 bulldozer to push to a Cat 966 loader feeding the processing plant which consisted of a hopper on to a hydraulically driven screen deck with wet bar to a single run sluice 27 inches by 12 feet. Two feet of coarse boulders and gravel, two feet of channel gravels and two feet of fractured bedrock were sluiced at a rate of 35 cubic yards an hour for an approximate total of 4800 cubic yards from one cut. After a very late start in August the site was abandoned on 12 September 1990.

QUILL CREEK **115 G 6**
W. Pfisterer **61°29'N 139°25'W**
Water Licence: YPM87-151 **1989**

This property is located at the lower reaches of Quill Creek, approximately four miles upstream from the Alaska Highway. Deposits are 12 feet deep and consist of mixed layers of sand, silt and gravel.

Mr. Pfisterer did carried out some limited sluicing in 1989. One miner using a Cat 580 rubber-tired excavator fed the small sluice with standard runs. Two 3 inch gas pumps supplied water to the wash plant at 350 igpm which processed material at 12 to 15 cubic yards per hour.

The operation was expanded in 1990 to include 1 yd^3 excavator, 977 loader, Case 580 backhoe with a double run sluice box 20 inches by 30 feet. Processed material was increased to 40 yd^3 an hour with a crew of three. One cut was mined during 1990.

View of a small placer operation owned by Willie Pfisterer, mining along the left limit of Quill Creek.

DUKE RIVER **115 G 6**
Robert Bathues **61°21'N 139°11'W**
Water Licence: YPM87-134L **1989, 1990**

This property is located on the left limit of the Duke River approximately 1 mile downstream from Squirrel Creek. The deposit consists of river gravels. One miner worked the property using a small 15 ton Hoe to feed the wash plant and a 55C Massey Fergerson rubber tired loader to remove tailings, with a D4 Cat bulldozer used push up pay and to recontour tailings.

Aerial view of Robert Bathues placer mining operation on the Duke River.

The wash plant consisted of a trommel with a small grizzly and standard sluice run, which processed 10 to 15 yards per hour.

A 4 X 4 Trash pump supplied water from the Duke River to the trommel at a rate of 500 igpm. Effluent was treated in a large out-of-stream settling facility that drained through seepage.

No activity evident in 1990 season.

REED CREEK **115 G 12**
Larry Tremblay **61°32'N 139°38'W**
Lorne Smith **1989, 1990**
Water Licence: YPM87-071RL

The current operation is located approximately 1000 feet up from the mouth of the canyon.

The stratigraphic section consisted of an average of 9 feet of sandy brown gravels overlying bedrock. Large boulders are present, including some several cubic yards in size. The deposit was frozen prior to stripping. The total gravel section was sluiced as well as 4 feet of bedrock.

A cut 20 feet wide by 800 feet long was worked in 1989. While working the cut, waste material was pushed to the unworked side until bedrock was cleaned. This material, along with any other waste material from the cut, will be pushed onto the mined out side as the second cut is being processed.

The property continued to be mined on a single shift basis by two miners.

Heavy equipment included a Cat D8 bulldozer used to work the cut, feed the loader and remove tailings, a Michigan 155 loader used to feed the box, and a 1 yard hoe to dig drains and stockpile.

The sluicing plant consisted of a wet grizzly, dump box, and single run sluice box. The grizzly was 8 feet wide by 10 feet long and screened material to less than 5 inches for the first four feet of its length, and to less than 3 inches in diameter for the remaining 6 feet. Material fell into the dump box and was washed into the 24 inch by 20 foot sluice run, lined with 2 inch riffles. A short 8 foot section of punch plate with 3/8 inch holes of which two feet was used in the main dump box, and 6 feet in the main run.

Gravity fed water was delivered to the dump box and spray bar independently by way of a 2 foot diameter pipe and a 6 inch pipe respectively. Sluice effluent is settled in a series of ponds downstream.

Cuts were open to expose bedrock and stratification for extensive study by geologists interested not only in placer but lode deposits.

Gold was reported as being angular in shape with quartz as large as 3/4 oz down to fine. Gold fineness ranged from 889 to 896.

Sluice plant with side dump hopper grizzly at Larry Tremblay's property on Reed Creek.

BACK CREEK 115 I 3
F. & G. COCHRANE 62°04'N 137°04'W
Water Licence: YPM87-011R 1989, 1990

The current operation is located on the upper section of Back Creek, approximately 2 1/2 half miles upstream of its confluence with Victoria Creek.

Deposits are 15 feet deep with 2 to 3 feet of silt, on 12 feet of gravel, overlying boulder clay. The lower 6 feet of gravels were sluiced.

Equipment on the property included one Cat D7-17A cable bulldozer used to strip and mine the cut, a Hough model 100 loader, equipped with a 6 cubic yard bucket used primarily to feed the plant and haul tailings, and a model Ford 550 wheeled tractor, equipped with a 1 1/3 cubic yard bucket and Hoe attachment used as a standby machine to the Hough.

The washing plant was the same as described in 1984: dump box, trommel 40 inches diameter by 15 feet long set at a gradient of 1/2 inch per foot, and single sluice run 24 inches by 24 feet. Grade on the run was set at 3/4 inches to the foot. The engine driving the trommel in 1984 was replaced with a Ford 4 cylinder diesel.

Washing rate was approximately 20 cubic yards per hour. Water for sluicing was supplied at a rate of 1000 igpm by a 6 inch Gorman Rupp, powered by a 4 cylinder Ford diesel. The instream recycle pond was situated immediately below a large presettling pond located immediately below the sluice plant.

Overflow from the recycle pond was settled in a series of 2 ponds downstream.

This operation saw some equipment changes in 1990. An Allis Chalmers AD16 is used for stripping and pushing to the processing plant now a 18" x 6' trommel screening to minus 3/4" with a 4' x 22" single run sluice box. One cut was mined at a rate of approximately 30 cubic yards an hour.

BACK CREEK 115 I 3
J. and B. Coghlin 62°04'N 137°07'W
Water Licence: YPM89-112 1989, 1990

This property is located on Back Creek about 2 miles upstream of its confluence with Victoria Creek and immediately downstream of F. Cockrane's operation. The deposit consisted of 2 to 3 feet of frozen black muck, over 13 to 16 feet of gravel on larger angular boulders and clay. The lower 3 to 4 feet of gravels and 1 to 2 feet of clay was sluiced.

The crew consisted of two miners working a single shift. A Cat D7F bulldozer, with U blade, was used to rip and push the overburden and stockpile pay for the Trojan 6000 loader, which fed the plant and removed tailings.

The wash plant was upgraded this year and consisted of a 16 by 16 foot hopper with spray bars, the gravels travelled down to the throat of the hopper and across half inch punch plate 9 inches wide by 18 inches long. The gravels that drop through the punch plate are classified on a long tom sluice . The larger gravels passover and drop on to a 1 1\4 inch chain bed conveyor-belt with spay bars, gravels are washed and dropped onto expanded metal classifiers with several back washes to the main sluice run. All coarse materials go up a sand screw and the fines are pumped to the main settling pond.

The 1990 season brought difficulties to this operation on the handling of 6 feet of thawed organic material which constantly migrated back to the cut and drain. Mr. Coghlin was successful in mining out three cuts at approximately 40 cubic yards an hour.

Gold was described as being angular and very rough. The fineness was reported as 760.

Loader removing oversize tailings from sandscrew at Jack & Burrel Coghlin's mining operation on Upper Back Creek.

VICTORIA CREEK 115 I 3
D & H Placers 62°05'N 137°05'W
Water Licence: YPM88-056 1989

This property is located at the junction of Eva Creek and Victoria Creek, tributaries of the Nisling River. The deposit consisted of 1 to 2 feet of frozen overburden over 8 to 15 feet of frozen gravels on clay. A crew of four used a Cat D8H bulldozer and a Cat 950 rubber-tired loader to mine one 50 foot by 200 foot cut.

The wash plant processed 50 cubic yards per hour and consisted of a feeder hopper, an oscillating screen deck, and a standard 2 by 20 foot sluice box. Water was supplied to the wash plant at 600 igpm from an instream reservoir using a 4 by 6 inch pump, powered by a 3 cylinder diesel.

Effluent was treated in a series of five out-of-stream settling ponds. Tailings were removed by the loader to the left limit where they were stockpiled for future recontouring.

In the spring of 1990 all equipment was removed from site, no activity for duration of season.

KLAZA RIVER 115 I 3
(UNNAMED TRIBUTARY) 62°09'N 137°12'W
T. Tullis 1989, 1990
Water Licence: YPM89-021

The current operation is located approximately 1/2 mile upstream from the Klaza River on a small left limit tributary. The tributary valley at this point is estimated to be 500 feet wide with gentle sloping walls.

The deposit consists of approximately 2 feet of organic material underlain by 10 to 12 feet of angular gravels which rest upon a red clay layer. The gravels contain large pieces of angular rock, some exceeding 2 feet square in size. The total deposit is frozen.

Stripping upstream of the cut has been done to facilitate thawing of future cuts. The total gravel section plus one foot of clay was sluiced.

Mr. Tullis worked the property on a single shift basis with one helper.

Heavy equipment on the property included a Cat D7 bulldozer used to prepare the cut, stockpile pay for the loader and push tailings, a Cat 950 loader used primarily to feed the plant, and a 3300 TT Hi-Hoe with a 7/8 cubic yard bucket for testing and ditching.

In 1989 the washing plant, used was a 48 inch by 30 foot trommel with "live bottom" sluice trays. A 2 HP electric motor provided the oscillating motion. All electric power to the plant was supplied by a 50 KW generator, powered by a D315 diesel engine.

Production was rated at 30 cubic yards per hour with water usage of 500 igpm, pumped by a 6 by 6 Gould's pump powered by a Baldor 60 HZ 20 HP Motor.

Sluice water was impounded in a small, out-of-stream reservoir immediately above the sluice operation. each 100 feet square.

Work on the property continued in 1990 with few changes. The deposit depth of 18 feet consisted of a 10 foot sandy muck layer on 5 feet of mixed angular gravel over a 3 foot mixed clay and boulder layer. Bedrock was decomposed sandy red granite. The sluice section averaged 6 feet in depth. The crew consisted of one to two miners and one cook. A Terex 8240 bulldozer was used for stripping, stockpiling for the loader, and to push tailings. Production was rated at 20 to 24 bank cubic yards per hour with 500 igpm used for sluicing.

Mr. Tullis continued to work this ground alone in 1990, mining out one cut of approximately 14000 cubic yards. Consideration is being given to abandoning this site in the 1991 season.

Gold was described as rough with a fineness of 760. Concentrates also contained abundant heavy black sand and quartz.

View of Cat 950 loader removing tailings from trommel sluicing plant at the Ted Tullis operation on the Klaza River.

KLAZA RIVER 115 I 3
(UNNAMED TRIBUTARY) 62°08'N 137°18'W
W.D.P. Placers, W.D. Perry 1989
Water Licence: YPM88-054

This property is located on a tributary of the Klaza River. The deposit consisted of 6 feet of black frozen muck interspersed with sand seams and quartz and oxidized granodiorite boulders over 12 feet of mixed gravel, angular rock, clay and sand on decomposed bedrock.

Two miners working a single shift used a Cat D6 to strip, remove tailings and stockpile pay for the John Deere 544B loader which fed the plant.

The wash plant consisted of a 5 by 18 foot trommel and feeder hopper with manifold spray bar, and a 3 inch spray bar ahead of the screening, and a 4 by 21 foot sluice run. The trommel contained 14 feet of "scrubber" and 4 feet of 1 inch screen. The sluice tray consisted of 4 feet of slick plate followed by 16 inches of riffles and another foot of slick plate. The 12 foot gravel section was processed at the rate of 16 cubic yards per hour using 600 igpm supplied from a ground-charged recycling pond using three 3 inch Yamaha pumps.

Effluent was treated in a pre-settling area and two 100 by 200 foot ponds.

The operation continued in 1989 with very little sluicing due to a shortage of water. The only activity evident in 1990 was the removal of equipment from the cut and marshalled at the camp.

The gold was described as porous and occasionally flattened, with 70% less than 35 mesh in size. The fineness was reported as 830.

GUDER CREEK 115 I 6
Derek Dodge 62°18'N 137°11'W
Water Licence: YPM89-002 1989

This property is located on Guder Creek, approximately 3000 feet upstream from Seymour creek. The valley is narrow here with steep valley sidewalls and a steep creek gradient. Water is in short supply.

The frozen deposits are approximately 15 to 18 feet deep consisting of 1 to 3 feet of muck, silt and volcanic ash overlying 12 to 15 feet of silt, sand and banded gravels containing large sub-angular boulders. Large boulders lay deep into decomposed bedrock.

In 1989 a single cut 500 feet long by 50 - 70 feet wide was begun. The sluice section consisted of approximately the lower 1/2 of the gravel section and 1 to 2 feet of bedrock.

A total of two persons worked the property on a single shift basis, and sluicing took place 10 hours daily.

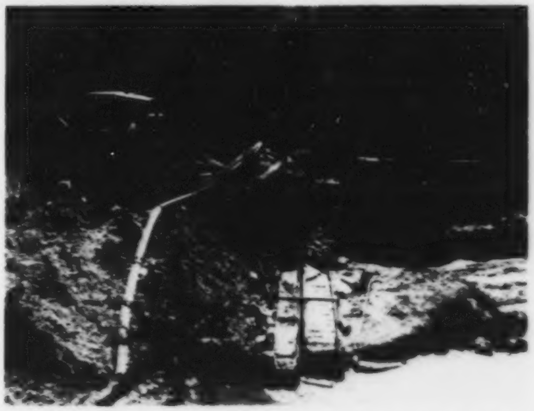
Heavy equipment on the property included a Cat D7 bulldozer used to strip, work the cut and feed the sluice box. A Cat 980B wheeled loader was used primarily to haul tailings.

The sluice plant consisted of an 8 foot wide derocker classifier (powered by a 3 cylinder Lister diesel) and dual sluice trays.

Washing rate averaged 80 - 100 cubic yards per hour with 1200 igpm. Total creek flow was impounded in an instream recycling pond 500 feet downstream of the plant. From there water was delivered to the plant via a 6 by 6 Monarch trash pump, powered by a Jimmy 4 cylinder diesel.

Effluent was treated in two ponds in series. No activity was reported in 1990.

Gold was reported as varied in character with a fineness of 838.



Derocker sluicing plant being fed by a Cat D7 bulldozer on Guder Creek.

REVENUE CREEK	**115 I 6**
Sikanni Oilfield	**62°20'N 137°17'W**
Construction Ltd.	
Licence: YPM90-023	**1989, 1990**

This operation was re-working K. Djukastein's tailings piles. Five miners worked two shifts using a 235 Excavator to feed a 78 inch by 40 foot trommel with eight centrifugal concentrators and single run 24 inches by 6 foot sluice. A Cat D8H removed tailings.

Coarse tailings down to fine sand approximately 20 feet in depth were processed at a rate of 100 yards an hour.

Water was acquired by a 10 inch x 10 inch centrifugal pump powered by a Cat TA15 power plant at a rate of 1600 igpm from a recycling pond.

No further work on this ground for 1991 is anticipated by Sikanni Oilfield Construction Ltd..

HAYES CREEK	**115 I 12**
Hayes Creek	**62°31'N 137°57'W**
G. Wilson	**1989, 1990**
Water Licence: YPM87-050	

This property is located on Hayes Creek, approximately 2 miles upstream from the Hayes Creek-Apex Creek confluence. Gold was first reported on Hayes Creek in 1898.

The stratigraphic section consisted of a total depth of 6 feet. The deposit mined was 30 percent frozen with one to two feet of silt on top of 4 feet of mixed gravels to bedrock. The bedrock floor was irregular and wavy with some sections being decomposed. The size of the cut was 450 by 600 feet long in 1989.

One miner using a Fiat Allis bulldozer and a Cat 988B loader worked single shifts on the property.

The wash plant consisted of a derocker and a 4 by 20 foot standard sluice run and processed at a rate of 80 to 100 cubic yards per hour. Water from an out-of-stream reservoir was supplied to the plant at 1200 igpm by a 6 by 6 inch pump powered by a 4 cylinder diesel.

During 1990 Mr. Wilson was in the development stage of a mining program at a new location on an unnamed tributary of Hayes Creek.

Gold recovered was flat and rough with a fineness of 880.

RUDE CREEK 115 J 10
A. Fournier 62°40'N 138°42'W
Water Licence: 1989, 1990
YPM87-017
YPM89-142

This property is located on Rude Creek near its confluence with Dip Creek. The deposit was 20 to 25 feet deep and frozen with 2 to 3 feet of overburden, over 18 to 23 feet of gravels on bedrock.

Four miners and one cook worked a single shift using a Cat D8H bulldozer to strip overburden and stockpile pay gravels, and a Cat 966 loader which removed tailings and fed the wash plant. Part of an on going cut was mined in 1989.

The wash plant consisted of a derocker and standard 4 by 20 foot long sluice box which processed 80 to 100 cubic yards per hour. Water was supplied to the wash plant from an out-of-stream reservoir by a 6 inch Flyght electric pump powered by a diesel generator that supplied 2000 igpm. Effluent was settled in an instream pond. The tailings were levelled and recontoured.

The 1990 season had three miners working a single shift operation using an International TD25C bulldozer to open the cut and pushing to a Cat 966C loader which fed the derocker with a 4 run sluice box 28"x 12' to a crossbox with ½" punch plate. Tailings were then removed and stacked by another Cat 966C loader. One cut was mined and sluiced at an approximate rate of 60 cubic yards an hour.

Gold was reported as 85% fine-grained and "flaky". It was 15% coarse with a fineness of 840 to 850.

BALLARAT CREEK 115 J 14
Mona M. Anderson 62°59'N 139°07'W
(Caleys Dream Inc.) 1989, 1990
Water Licence: YPM87-162L

This property is located near the head waters of Ballarat Creek, a right limit tributary of the Yukon River. In 1989 and 1990 the operation continued upstream.

The main valley is narrow and has steep hillsides. The right limit hillside appears to have slumped over the centre of the valley. The stratigraphic section has been influenced by slumping in areas and the total depth varies from as little as 3 feet to as much as 15 feet. The gold has been found in a narrow snaking pay zone in a shallow layer above and just into bedrock. The lower 2 to 3 feet of gravels and 6 inches of bedrock were sluiced. A total of three cuts in 1989 and four cuts in 1990 that measured 35 feet wide by 150 feet long were sluiced.

Mr. Fuhre, M. Anderson and two employees ran the mining operation on a single shift.

Stripping and continuous testing was done with a Cat D8K bulldozer and a 235 hoe. Pay was stockpiled and sluiced with tailings being ramped away by the Cat D8K. The 235 Hoe fed the sluice box.

The wash plant consists of a conventional single run sluice and dump box. The dump box measures 10 feet wide by 15 feet long and is lined with coco matting, expanded metal and 1/4 inch punch plate. The washed pay is fed into a 3 foot wide by 30 foot long sluice run. Coco matting, expanded metal and 2 inch angle iron riffles were used in the run. While sluicing at capacity 120 to 150 cubic yards per hour could be processed. Water was provided for sluicing by a 10 by 12 inch pump and gravity line. Water was collected in an instream holding/pump pond upstream of the sluicing operation. The effluent was settled in instream settling ponds below the sluicing area that were built from mined out cuts.

The gold is primarily coarse and has been screened to 20% + 4 mesh, 25% - 4 + 8 mesh, 25% - 8 + 12 mesh, 20% - 12 + 18 mesh with the remainder - 18 mesh. Fineness was 860.

SCROGGIE CREEK/ 115 J 15/16
MARIPOSA CREEK 63°00'N 138°30'W
Resore Industries Corp. 1989, 1990
Water Licence:
YPM86-147R
YPM89-003
YPM89-130

Resore Industries mined on Mariposa Creek and on Scroggie Creek in 1989 and 1990. This is a large company and the equipment and men were split between two active operations.

The deposit varies very little and averages 15 feet. A seven foot thick layer of black muck topped with vegetation overlies 8 feet of consolidated cobbles. Large boulders are common on Scroggie Creek but appear less frequent on Mariposa Creek. Bedrock tends to be a soft Klondike schist. Hard consolidated dykes are encountered on Scroggie Creek. Some cross cut the valley and others follow the general direction of the valley. The lower 2 feet of gravel and 2 feet of bedrock were sluiced on Mariposa Creek. The pay is found in a wider zone on Scroggie Creek so 3 feet of gravel and 4 feet of bedrock were sluiced. The cuts were rim to rim on Mariposa Creek but the Scroggie valley is much wider. Seven 300 by 300 foot cuts were sluiced on Mariposa Creek during 1989. Ten 300 by 300 foot cuts were sluiced at the mouth of Mariposa in 1990. Seven 300 by 300 feet cuts were mined on Scroggie Creek just upstream of Stevens Creek in 1989. Ten 450 by 200 feet cuts were mined on Scroggie Creek in 1990.

In 1989 an eleven person crew was required to run the two operations. This figure was increased to twelve in 1990. Double shifts were used in both years.

Two Komatsu D355A bulldozers were used for stripping, stockpiling pay for sluicing and maintenance of settling facilities. Two WA600 rubber tired loaders fed the wash plants and ramped tailings. A Komatsu D155A bulldozer assisted with stockpiling pay, road building and an exploration program. This equipment was easily moved from site to site so it was used in various combinations on Mariposa and Scroggie Creek in 1989 and 1990.

Two wash plants were used at various times on each creek. Either a derocker feeding a modified four run model 300 Ross Box or a wet grizzly leading into a 3 run model 300 Ross Box was used. A total of 78 feet of sluice run is used with the derocker. The wet grizzly leads into 67 feet of sluice run. Various combinations of matting, expanded metal, angle iron riffles and punch plate were used in the sluice runs. Production was calculated at between 180 and 250 cubic yards per hour. Instream recycle ponds were used on both creeks to provide enough water for sluicing. Either a 10 by 12 inch Peerless pump powered by a 3304 Cat engine or a 10 by 12 inch Worthington pump powered with a 3208 Cat engine supplied water to each wash plant. Primary settling was provided in the recycle ponds with further settling in downstream mined out cuts which have been turned into settling ponds.

The gold on both creeks is quite coarse with 40% + 10 mesh. The gold varies between smooth and rounded to rough and flat. The fineness is 895 on both creeks.

KATE CREEK	**115 N 2**
Moosehorn Exploration	**63°05'N 140°53'W**
Water Licence: YPM88-040	**1989, 1990**

This property is located on Kate Creek, a tributary of Lesaux Creek which flows into the Ladue River. The Moosehorn Range is one of the newest placer mining areas in Yukon. Moosehorn Exploration started their first cut near the headwaters and are working upstream from that location.

The stratigraphic profile has been found to vary considerably from cut to cut and between each limit. Overburden is non existent in some areas and in others there is as much as 8 feet of frozen black muck.. On average there are about 13 feet of gravels of which only the lower 7 feet is high grade pay. Fractured and decomposed bedrock is common on this creek. Although the upper gravels are lower grade they contain some gold and are sluiced as well as the high grade lower gravels. Up to 2 feet of the bedrock is ripped and sluiced as well. Two cuts 150 feet wide by 200 feet long were expected to be mined during 1990. A bedrock rise was discovered as the stripping moved upstream so more rapid progress up Kate Creek may be realized.

Ian Warrick, his wife Kate and two employees ran this operation on a single split shift.

Heavy equipment at this operation includes a Cat D7 bulldozer, an International 125C Trac loader, a John Deere 350 bulldozer with backhoe and a Cat 966E loader. The D7 bulldozer was used for stripping and ripping bedrock. The 966E front end loader was used to feed the sluice box and carry tailings away. The Trac 125C loader and 350 bulldozer served as back up equipment only.

The sluice plant consists of a dump box with a spray bar to wash the pay. The washed gravels then pass over a floating grizzly which classifies to approximately minus 1 inch. The minus 1 inch gravels then fall into a single sluice run 8 feet wide by 16 feet long. Nomad matting with expanded metal is used throughout the sluice run. The processing rate was estimated at 45 cubic yards per hour using an estimated 1500 igpm of water. The water is pumped to the sluice plant by a 6 inch Monarch trash pump powered by an Izusu diesel engine. In 1989 full recirculation was needed but in 1990 an instream pump pond upstream of the cut was used. At the beginning of 1990 a single instream settling pond was used but as mining progressed upstream old cuts were utilized as additional settling ponds.

The gold was reported to be predominately fine grained with an occasional small (4 mesh) nugget. The gold was rounded and quartz showed up on some pieces. The fineness is 820.

SWAMP CREEK	**115 N 2**
Canada Tungsten Mining	**63°02'N 140°56'W**
Corporation Ltd.	**1990**
Water Licence: YPM89-080L	

This mine is located near the headwaters of Swamp Creek. Swamp Creek flows out of the west side of the Moosehorn Range in a south southwest direction into Alaska. Throughout 1983 and 1990 the mining operation moved downstream.

The stratigraphic profile is made up of approximately 32 feet of frozen material. The first 16 feet is comprised of an organic layer covering black muck and layers of clay, silt and sand. The remaining 16 feet are made up of sand and pay gravels. Mr. John Clark has identified bedrock as decomposed granodiorite. The upper 16 feet of sand and gravel is ripped and carried to the sluice plant to be processed. The bedrock is scraped but none is sluiced. One large cut measuring on average 150 feet wide by 1125 feet long was stripped and sluiced in 1990 (100,000 cubic yards sluiced). The 1990 cut was a downstream continuation of the 1989 cut.

This mine was run by a crew of 14 which included 2 management personnel. This crew worked a double shift throughout the season.

A Cat D9H bulldozer, a Cat D8K bulldozer, a Cat 980 loader, two Cat 966 loaders, a Cat 235 excavator, a Cat 245 excavator, two DJB350 haul trucks and an Euclid R22 haul truck were used to mine this property. The bulldozers stripped and ripped the ground. The excavators loaded the haul trucks which carried the pay to the sluice plant. The loaders fed the sluice plant and carried tailings away. The D8K dozer helped clear tailings later in the 1990 season as well.

The sluice plant consists of a derocker feeding a screening plant which in turn feed 3 sluice runs. The derocker classified the pay to minus 2 inch with the screen plant further classifying the pay to minus 3/8 inch for the sluice runs. The oversize from the screen plant is carried a short distance from the sluice plant by a conveyor and dumped for the loader to carry away. Approximately 65 cubic yards per hour is sluiced using 2200 igpm of water. A 10 by 12 inch pump powered by a 60 HP electric motor or a diesel pump supplies the water to the sluice plant. Since this operation is located near the head waters of Swamp Creek there is only a small drainage area to collect water. To provide enough water for sluicing all season a large and impervious instream total flow reservoir was built rim to rim. This pond was used throughout 1989 and 1990 for 100% recycle. The small inflow did not keep up with evaporative loss through hot periods. The sluice plant remained near the recycle pond requiring the transportation of the pay gravel to the sluice plant. Primary settling occurs in the recycle pond with another large settling pond downstream below the cut as a finishing pond for any seepage or water from the cut.

The trees and vegetation have been cleared prior to the stripping program. The overburden is then pushed over the stock piled vegetation and progressively contoured and sloped. Cuts stripped early in the 1990 season were found to be largely revegetated with grasses by the fall of 1990.

The gold recovered was confined to a narrow channel initially but appears to be fanning out as the operation moves downstream. The gold is primarily fine grained with 90% between 35 and 100 mesh. The fineness is 800.

MATSON CREEK **115 N 7**
Lode Resources **63°30'N 140°39'W**
Water Licence: Y2L3-2676 **1989, 1990**

Lode Resources has mined on Matson Creek intermittently for the last ten years. Mining in 1989 and 1990 occurred at the mouth of Bow Pup which is near the headwaters of Matson Creek.

The stratigraphic section varies considerably but averages 12 feet to bedrock. A 4 foot thick layer of frozen black muck overlies 6 feet of gravel. Bedrock is decomposed Klondike Schist. Anomalous holes with 15 to 20 feet of black muck and 12 feet of gravel are occasionally found. The lower 2 feet of gravel and 6 inches of bedrock are sluiced. Several small cuts were sluiced in 1989 which had been previously stripped. Two cuts measuring 300 feet wide by 300 feet long were stripped and sluiced in 1990.

Bert Savage and his wife, two operators and a box-tender ran this operation in 1989 and 1990.

The cuts were stripped with two Cat D9G bulldozers and a Cat D9H bulldozer. One of the Cat D9G bulldozers fed the sluice box while sluicing. A Cat 980C loader carried tailings away and was used for other odd jobs such as clean-up. A Cat D8K bulldozer and a Case angle blade bulldozer were kept on the property as spare equipment.

The wash plant consisted of an end push dump box feeding a single run sluice. The dump box is 18 feet wide by 31 feet long. A spray bar and a monitor washes the pay gravels well before entering the main run. Coco matting, 3 inch angle iron riffles and 1 inch punch plate lines the lower end of the dump box. A 4 foot wide by 64 foot long sluice run is used. The first 32 feet is lined with coco matting, 3 inch angle iron riffles and 1 inch punch plate. The lower 32 feet of the sluice run is an area of open 3 inch angle iron riffles over coco matting. To recover the larger nuggets every second angle iron riffle was removed in a 15 feet area at the top of the open riffle section. Production was estimated at 200 cubic yards per hour. A 10 by 12 inch Paco pump powered by a 3208 Cat engine supplied 3000 igpm for sluicing. Water is pumped from an out-of-stream recycle pond to the sluice box. Effluent re-enters the pump pond and any outflow is by seepage loss. Make-up water is captured from Bow Pup when needed. Normally Bow Pup flows around the mining operation and enters Matson Creek.

The gold recovered is fairly coarse grained although gold off benches mined in past years has been very fine grained. Occasional smooth rounded gold is recovered but usually the gold is rough. Fineness is 893.

SIXTY MILE RIVER **115 N 15**
Larry Haner **63°59'N 140°46'W**
Water Licence: **1989, 1990**
YPM87-046
YPM89-149

Larry Haner continued a four man operation in the Sixty Mile River valley about half way between Miller Creek and Big Gold Creek. He has been operating in this area for over ten years. A large diversion channel has been constructed to move the Sixty Mile River from its original location near the right side of the valley into the centre of the valley through areas which had been previously mined out.

One Cat D9H bulldozer was used for stripping and stockpiling overburden and for digging and pushing pay gravels. One Cat 980B front end loader was used to feed the wash plant and one Cat 960 front end loader was used to stock pile tailings. A 3500 Insley backhoe was used to dig and clean drains and settling ponds.

The wash plant consisted of a hopper with monitor to control feed to a double sluice run with 15 feet of 1/2 and 3/4 inch punch plate in the main run which was 36 inches wide by 30 feet long with undercurrent feed to the side run which was 36 inches wide by 12 feet long with expanded metal riffles. Approximately 1800 igpm of water was supplied by an 8 by 10 inch Paco suction pump. About 90 yards per hour were processed.

Having completed mining the central portion of the valley, mining cuts were made on the right side of the valley bottom. Up to 8 feet of black muck was mechanically stripped and stockpiled. The gravel layer was from 7 to 10 feet deep and bedrock varied from blocky to decomposed clay like schist. The bottom 3 feet of gravel plus 2 feet bedrock were processed from four mining cuts each with surface dimensions of approximately 150 by 250 feet.

Water was pumped from a small reservoir on the ditch fed from the Sixty Mile River. Wastewater was settled in large out-of-stream settling ponds in old mining cuts prior to discharge back to the Sixty Mile River.

Gold recovered was 70% fines (minus 40 mesh) 20% flat and coarse flakes and 10% nuggets, with a fineness of 830.

SIXTY MILE RIVER	**115 N 15**
Brisbois Bros. Const. Ltd.	**63°59'N 140°47'W**
Water Licence:	**1989, 1990**
YPM89-118	
YPM89-119	

This operation continued in 1989 and 1990 at the same location on the left limit of the Sixty Mile River valley immediately downstream from Miller Creek. Two miners worked one twelve hour shift with two camp workers.

Two Cat D9 bulldozers were used to dig pay gravel and to push overburden. A Cat 992 front end loader and a Cat 988 front end loader were used to feed the wash plant and stack tailings. The wash plant was an 8 by 20 foot dump box lined with 3/4 inch punch plate and a single run sluice 48 inches wide with standard angle iron riffles over plastic mating. A 12 by 14 inch Gould pump, powered by a D343 Cat diesel, delivered up to 4500 igpm which was used to process as much as 200 yards per hour.

Pay gravels were excavated from a deep gravel layer on the extreme left limit of the Sixty Mile River valley. Up to 25 feet of frozen, black muck was removed mechanically and stockpiled to expose the gravels which increased in depth as the pay cut was worked further back into the base of the hillside. By the end of the 1990 season the gravel layer was up to 75 feet deep. The bottom 4 feet of gravel plus 2 feet of bedrock were sluiced from two cuts with surface dimensions of approximately 50 by 75 feet.

Water was pumped from a small reservoir supplied by a ditch from the Sixty Mile River. Waste water was settled in several out-of-stream ponds prior to discharge back to the Sixty Mile River.

Gold recovered was 80% minus 12 mesh. Larger flakes and nuggets were flattened. Fineness was 840.

MILLER CREEK	**115 N 15**
Klondike Underground Mining	**63°59'N 140°48'W**
(Richard Coke)	**1989, 1990**
Water Licence: YPM88-008	

In 1989 and again in 1990 seven miners were employed during the winter months of February, March and April. The miners excavated frozen gravels from underground adits on the left limit of Miller Creek, about one half mile upstream from its mouth on the Sixty Mile River. About 20,000 cubic yards were excavated and stockpiled in 1989 and about 14,000 cubic yards in 1990. Stockpiled gravels were then sluiced during each summer by a four man crew. Two scoop trams, one with a 3 1/2 yard bucket and one with a 6 yard bucket, were used to carry pay gravels from underground to the stockpile in the Miller Creek valley. One Cat D7G bulldozer pushed stockpiled pay gravel to the wash plant.

The wash plant had a hopper feed to a double oscillating screen deck which classified materials to minus 3/4 inch followed by oscillating double sluice runs each 3 feet wide by 23 feet long. The discharge water containing all minus 3/4 inch gravel and sand was collected at the end of the sluice runs and pumped by an 8 by 6 inch Allis Chalmers, rubber lined slurry pump to a settling pond on the left limit bench. Water was pumped from an out-of-stream recycle pond by an electric 6 by 5 inch pump. From 1000 igpm to 1300 igpm were used to process about 70 yards per hour.

Gold was mixed fine grained and coarse grained with fineness around 850.

BEDROCK CREEK **115 N 15**
6803 Yukon Ltd. **63°58'N 140°51'W**
Water Licence: **1989, 1990**
YPM87-004
YPM89-169

This was a three man operation located on Bedrock Creek upstream from its confluence with Sixty Mile River. During 1989 and 1990 the operation was sub-contracted by Lorne Mallot and son from S. Prohazka. One Cat D8K bulldozer and one Cat D9G bulldozer were used to strip overburden, dig pay gravel and remove tailings. One John Deere 644 front end loader was used to feed pay gravel to the wash plant.

The wash plant had a dump box with punch plate and three sluice runs each 36 inches wide with expanded metal riffles over nomad matting. A 10 by 10 inch Cornell pump delivered approximately 2500 to 3000 gallons per minute which was used to process between 80 and 150 cubic yards per hour.

The stratigraphic section at the mining cuts in the main valley bottom near the centre averaged 3 to 4 feet of black muck on top of 6 to 8 feet of gravel with a clay layer up to 4 feet deep on top of decomposed bedrock. The bottom 4 feet of gravel plus the clay layer and about 2 feet of bedrock were processed. Two cuts were mined in 1990 approximately 100 by 300 feet each.

Water was pumped from an out-of-stream reservoir and settled in an out-of-stream settling pond before discharge back to Bedrock Creek prior to its confluence with Sixty Mile River.

Gold recovered was flattened and mostly 60 to 100 mesh with a fineness of 820.

BEDROCK CREEK **115 N 15**
Jack Stewart **63°59'N 140°57'W**
Water Licence: YPM88-110 **1989, 1990**

This one man operation was located near the upper forks of Bedrock Creek approximately four miles upstream from its confluence with the left limit of the Sixty Mile River.

One Cat D7 bulldozer was used for stripping overburden and digging test pits in the ground. Overburden is sandy and averages 3 to 4 feet deep. Gravels average 8 to 10 feet deep to bedrock. The bottom 2 or 3 feet of gravel plus about 1 foot of bedrock have been tested using a long tom only. Full scale processing has not yet begun. About 3000 yards of overburden were stripped down to gravel in 1990. Stripped areas are located on the left limit and right limit of Bedrock Creek and on two unnamed tributaries.

Water was fed to the long tom by gravity pipeline with out-of-stream settling in small ponds. The creek remained in its original channel, away from the worked areas.

Gold recovered in tests so far has been a mixture of fine and coarse grained gold but no nuggets. Fineness is unknown.

BARKER CREEK 115 0 2
Barker Creek Placer Exploration 63°05'N 138°56'W
Water Licence: YPM89-050 1989, 1990

This operation was located on Barker Creek immediately upstream of Iron Creek, a right limit tributary of Barker Creek. The operation ran throughout the 1989 season but did not operate in 1990.

The deposit mined varied from 8 to 14 feet deep. Between 4 and 8 feet of frozen black muck covers 4 to 6 feet of gravel. Bedrock is a decomposed schist. All of the gravels were sluiced but the bedrock did not contain any gold. Two cuts were sluiced in 1989 each measuring 150 feet wide by 200 feet long.

The number of people in camp changed over the season but there was an average of five employees including the mine manager.

Feeding the sluice plant at Barker Creek Placer Exp. Corp., Barker Creek. The gravels are mined and tailings removed by A Cat D8H bulldozer.

A John Deere 890 hoe and two Cat D8H bulldozers were used to mine at this location. The Cat D8H bulldozers were used for stripping, pushing pay over to the sluice plant and to push tailings away. The 890 hoe was used for digging trenches, digging drains and for feeding the sluice box.

The sluice plant consisted of a grizzly sitting above a dump box leading into a 3 run sluice. A combination of astro turf, expanded metal and 3/4 inch punch plate is used in the dump box and the center run. The two side runs are lined with astro turf, expanded metal and angle iron riffles. The centre run measures 18 inches by 24 feet long and each side run measures 3 feet wide by 24 feet long. The processing rate is estimated to be between 120 and 150 cubic yards per hour using approximately 3,000 igpm of water. A 10 by 10 inch pump powered by a 671 GMC engine supplies water to the sluice plant from an instream pump pond upstream of the cuts. Overflow culverts enabled excess water to flow into the bypass channel around the cuts. Effluent was settled in a large out-of-stream settling pond.

The gold recovered was primarily fine and flat. The fineness was not determined at the time of inspection but was believed to be 890.

BARKER CREEK 115 0 2
Robin Burian 63°07'N 138°55'W
Water Licence: YPM89-044 1989, 1990

Mining at this site occurred on a left limit bench above Barker Creek.

The deposit mined is between 10 and 12 feet deep. The ground was cleared and partially stripped years ago which allowed the ground to thaw. The stratigraphic profile consists of 6 to 8 feet of overburden on 4 feet of gravel. Bedrock tends to be decomposed for 1 to 2 feet and then is slightly fractured consolidated rock. A single cut 300 feet long by 200 feet wide was stripped in preparation for sluicing in 1990.

Burian ran this operation by himself throughout most of the 1990 season. Later in the season he brought another miner in to help with the sluicing.

Heavy equipment at this site consists of a Cat D7E bulldozer and a Cat D6 bulldozer. The D7E was used for stripping, feeding the sluice box, clearing tailings and maintenance of the settling ponds. The D6 is rarely used.

The sluice plant consists of a side dump box with a single run sluice. The dump box measures 9 feet wide by 23 feet long. The top 3 feet is a section of slick plate with the lower 6 feet set up using astro turf matting, expanded metal and grader blade riffles. The sluice run measures 32 inches wide by 20 feet long. Astro turf matting, expanded metal and 2 inch angle iron riffles are used the length of the sluice run. The processing rate of the sluice plant was not known. Due to approximately a 100 foot lift onto the bench and difficulties with the pump, the amount of water required for sluicing wasn't known. A 10 by 12 inch pump powered by an International UD18 engine supplied water for sluicing. The water was pumped from an instream deep pool in Barker Creek. Settling facilities were provided by channeling the effluent off the bench into a series of three out-of-stream settling ponds on the left limit side of Barker Creek. Final outflow from the settling ponds was directed out onto the swamp beside Barker Creek. Discharge to Barker Creek is by ground seepage only.

The gold recovered at the time of inspection tended to be coarse, smooth and flattened. The gold was expected to be in the range of 850 to 890 fineness.

SCROGGIE CREEK **115 0 2**
Zdenek Bidrman **63°07'N 138°37'W**
Water Licence: YPM89-030 **1989, 1990**

This mine is located approximately 7000 feet downstream from the confluence of Walhalla Creek and Scroggie Creek. A left limit bench of Scroggie Creek is being mined. 1989 was a set-up and sluicing year while only a small amount of activity occurred in the spring of 1990.

The deposit on the bench is relatively shallow and varies between 10 and 15 feet to bedrock. Very little of the profile is frozen which enabled the stripping work to be done easier than normally would be expected. Between 8 and 12 feet of gravels lie beneath a maximum of 2 feet of overburden. Layers of mud throughout the gravel strata were common. Bedrock has been highly decomposed to sand or clay. The lower 2 feet of gravel and up to 2 feet of the bedrock is sluiced. Two cuts measuring 45 by 150 feet and 180 by 200 feet were stripped and sluiced in 1989. A single cut 250 by 100 feet was sluiced early in the 1990 season. No other activity was noted in 1990.

Zdenek Bidrman and two other miners worked at this site in 1989. Zdenek returned and sluiced a single cut by himself in 1990.

Two Cat D8H bulldozers stripped the cuts and cleared tailings away during the sluicing in 1989. A Warner - Swasey hoe fed the sluice box and dug trenches. A cut had been stripped already so the D-8H was not needed when Zdenek returned in 1990. The sluice plant was fed with the hoe as it had been in 1989.

The sluice plant used in 1989 consists of a 4 foot screening plant which classifies the pay to minus 3/8 inch. Approximately 30 cubic yards of gravel per hour were sluiced using 400 to 500 igpm of water. A sluice plant with a dump box leading into a grizzly and a single sluice run was used in 1990. Up to 70 cubic yards of gravel per hour were sluiced in 1990 with 1500 igpm of water. Water was pumped from an instream pump pond on Scroggie Creek conveyed by way of a ditch to the left limit bench sluicing operation. The water was then recycled on the bench with no discharge. Approximately every three days make-up water was required. The water was pumped onto the bench by a 10 by 10 inch Allis Chalmers pump powered with a 250 HP Cummings engine. A 3 inch Honda and a 4 inch Wisconson pump supplied water to the sluice plant in 1989 from the recycle ponds. The 1989 cuts filled with enough water to allow usage of the recycle ponds for the single cut sluiced in 1990. The 10 by 10 inch Allis Chalmers pump supplied water for the sluice plant in 1990.

Gold recovered varied between fine and coarse grained. The gold was rounded and very little quartz appeared. The fineness was reported at 900.

KIRKMAN CREEK **115 0 3**
Fell-Hawk Placers **63°01'N 139°15'W**
(Joe Fellers) **1990**
Water Licence: YPM89-168

This mine is located in the center of Kirkman Creek, a tributary of the Yukon River. 1990 was the first season for Joe Fellers on Kirkman Creek. The spring and part of the summer were used for hauling equipment in and setting up. 1991 will be the first full season.

The area that was mined in 1990 had been previously cleared which thawed the ground to bedrock. The stratigraphic profile is made up of 2 to 3 feet of muck overlying 12 feet of gravel. Bedrock is consolidated except for the top few inches. Only the lower 1 to 2 feet of the gravels and very little of the bedrock were sluiced. Three cuts were stripped and sluiced in 1990. The first cut was 40 feet wide by 500 feet long by 15 feet deep, the second cut was 180 feet wide by 300 feet long by 15 feet deep, and the third cut was 100 feet wide by 200 feet long by 15 feet wide.

This operation was run by Joe and Wendy Fellers and a single employee.

Stripping was done with a Cat D8L bulldozer. A Cat D7 bulldozer fed the sluice plant and a Cat 966 loader carried tailings away and was used for various other jobs. The sluice plant consists of a derocker feeding a 5 foot wide by 20 foot long single sluice run. The sluice run was lined with nomad matting, expanded metal and

2 inch angle iron riffles. Up to 150 cubic yards per hour were sluiced with an estimated 2,500 igpm of water. An 8 by 10 inch pump powered with a 3208 Cat engine supplied water to the sluice plant. The water was pumped from an instream recirculation pond. Effluent treatment was provided initially by the instream recirculation pond with final treatment in two instream settling ponds further downstream.

The gold recovered was primarily coarse (50% was coarser than 8 mesh). Some was rough and some was smooth. Although none of the gold had been refined the fineness was expected to be close to 900.

THISTLE CREEK 115 O 3
Faith Mines 63°05'N 139°17'W
Water Licence: YPM89-035 1989, 1990

Faith Mines was located along the left limit of Thistle Creek near Blueberry Pup in 1989 and 1990. The 1989 season was the first year of mining for Faith Mines on Thistle Creek.

The deposit is shallow with an average depth of 10 to 14 feet to bedrock. Immediately downstream of Blueberry Pup the stratigraphic profile was made up of a thin one foot organic layer on top of a 5 foot thick layer of sandy, loamy creek bed. Up to 8 feet of gravel was encountered on top of the bedrock which varied from decomposed schist to gumbo clay to vertically fractured blocky bedrock. Upstream of Blueberry Pup the profile was made up of 2 feet of organics on top of a 6 to 8 foot thick layer of gravel. The gravels sit on a broken schist bedrock. In 1989 the lower 6 feet of gravel and 1 1/2 feet of bedrock were sluiced. In 1990 more of the gravel was wasted. The lower 3 feet of gravel and up to 2 feet of bedrock were sluiced. Ten cuts averaging 250 feet wide by 300 feet long were sluiced in 1989 although some cuts were larger (300 feet wide by 650 feet long). Five cuts averaging 400 feet wide by 400 feet long were mined in 1990. The cuts tended to be largely frozen although thawed areas were encountered.

A crew of five, including Mike and Jay Hughes, (owners/mine managers), ran this operation in 1989 and 1990 on a single regular shift. In addition, a full time camp cook was employed.

Three Cat D8K bulldozers were used for stripping and feeding the sluice box in 1989. A Cat 980C loader ramped tailings. In 1990 a Cat D9H bulldozer was acquired and used for stripping. Two D8K bulldozers were used to feed the sluice box and the 980C loader continued to be used for ramping tailings.

The photo shows a very busy placer mining operation on Thistle Creek, run by Faith Mines.

A model 300 Ross Box was used in 1989. The two side runs had been blocked off since most of the gold is coarse. The dump box had a series of three steps and was lined in the lower reach with nomad matting, angle iron riffles and 1 1/2 inch punch plate. The run was lined with nomad matting, expanded metal, angle iron riffles and 3/4 of the run used punch plate. One hundred and seventy five yards per hour were sluiced. By the end of 1989 the 300 Ross Box was worn out and a new box was needed. A custom made sluice box was built in Whitehorse over the winter and was hauled in to the mine site on a winter road in the early spring of 1990. The sluice plant consists of a large dump box feeding a single sluice run. The dump box measures 23 feet wide by 20 feet long and is lined with unbacked nomad matting, expanded metal, flat bar riffles and punch plate. The 4 foot wide by 57 foot long sluice run incorporates three 6 inch drops near the top. Punch plate lines the drop sections with the remainder of the run lined with unbacked nomad matting, expanded metal and flat bar riffles. The processing rate rose to 250 cubic yards per hour with the new sluice box. A 10 by 12 inch pump powered by a 3208 Cat engine supplied the 4000 igpm needed to sluice in 1989 and 1990. Water was pumped from an out-of-stream recycle pond made from the previous cut. Make up water came from Blueberry Pup. As the operation moved upstream further settling ponds were built. By the end of 1990, six out-of-stream and two large instream settling ponds were in place. The left limit hillside of Thistle Creek is expected to be monitored in future years and these settling ponds will provide the necessary settling facilities.

The gold is almost entirely coarse, 30% of the gold was coarser than 4 mesh, 40% of the gold was between 4 mesh and 6 mesh and 30% of the gold was less than 4 mesh. The fineness is between 880 and 890.

SESTAK CREEK 115 0 5
Bill Trerice 63°29'N 139°45'W
Water Licence: YPM89-081 1989, 1990

This property is located on Sestak Creek, a left limit tributary of the Yukon River. Much of the early 1990 mining activity involved sluicing left limit side pay left behind by Midas-Rex during the 1989 season. Towards the end of the 1990 season Bill Trerice moved his operation up stream to where Midas-Rex finished in 1989.

The deposit averages 13 feet deep. Roughly 4 to 5 feet of frozen black muck overlies 8 to 9 feet of frozen gravels. Bedrock is highly variable and ranges from slightly fractured consolidated to fully decomposed clays. The upper 4 feet of gravels were stripped and stockpiled. The lower 4 to 5 feet of gravels hold almost all of the gold and are sluiced. Some gold is found in the fractured bedrock and where possible 1 foot is ripped and sluiced. The fully decomposed clay bedrock has not been found to hold any gold. Bill Trerice hoped to sluice six cuts totalling approximately 18,500 cubic yards for 1990. By mid season approximately 60% of that total had been sluiced.

Bill Trerice and two other employees worked this property on a single 10 hour shift.

Heavy equipment consists of a Komatsu D355 bulldozer which was used for stripping, and a Cat D8 bulldozer which fed the sluice box and cleared tailings. A Cat 966 loader fed the sluice box on one of the cuts and was used for any lifting requirements.

The sluice plant consists of a derocker with a 20 foot long by 4 foot wide single run sluice. Combinations of expanded metal and slick plate coupled with 1 inch angle iron riffles and unbacked nomad matting were used in the sluice run. The processing rate was approximately 80 cubic yards per hour using less than 1600 igpm water. The water is pumped to the sluice box by a 6 by 6 inch Monarch pump powered by a 30 HP electric motor. Electricity is generated by a 50 KW power plant. The water is pumped to the sluice plant from an out-of-stream recycle pump pond. Make up water is obtained through seepage inflow from the main creek. The settling facilities are located out-of-stream as well and effluent outflow is primarily by seepage. Towards the end of the 1990 season Sestak Creek was routed through the settling ponds and the settling facilities became instream.

The gold recovered was described as primarily flat and fine grained. Sixty percent was screened to 18 mesh and finer. Some quartz is attached and the fineness of the gold is 815.

SESTAK CREEK 115 0 5
Midas Rex 63°29'N 139°45W
Water Licence: YPM89-020 1989

During the 1989 mining season Stuart Schmidt ran a four man operation on Sestak Creek, a left limit tributary to the Yukon River just upstream from its confluence with the Sixty Mile River. One Cat D9L bulldozer was used to dig and push gravel as well as for stripping overburden and stacking tailings. The wash plant was a 14 by 25 foot dump box and triple run sluice, with punch plate in the center run and expanded metal in the side runs. All sluice runs were 4 feet wide by 20 feet long. A 10 by 12 inch Morris pump, powered by a 3408 Cat diesel engine, provided approximately 4000 igpm which was used to process up to 200 cubic yards per hour. A total of approximately 800,000 cubic yards were sluiced from rim to rim in the valley bottom from about 400 meters to 3000 meters above the mouth of Sestak Creek. Gravel averaged from 8 to 10 feet deep under 4 to 6 feet of overburden. Bedrock was deeply fractured and streaked with clay. The bottom 6 to 8 feet of gravel plus 2 feet of bedrock were processed through the wash plant. Water was recycled from two large, instream settling ponds.

Gold recovered was mostly fine grained near the valley center with more coarse gold nearer the sides. Flakes were flattened and a few small nuggets had quartz attached. Fineness was 810.

MAISY MAY CREEK 115 0 6/115 0 7
Queenstake Resources 63°21'N 139°00'W
Water Licence: YPM87-032RL 1989

This property is located along Maisy May Creek, which has a gentle gradient and a moderately wide valley. The stratigraphy consists of one foot of vegetation underlain by up to 20 feet of frozen black muck and 5 to 6 feet of frozen gravel. The bottom 4 feet of gravel and 3 feet of bedrock was sluiced.

Nine miners and five others worked 2 shifts in 1989. Heavy equipment included two D9L bulldozers for stripping waste and stockpiling pay, a 980C loader for moving tailings, and a Cat EL300 backhoe for feeding the wash plant. Other equipment for miscellaneous tasks included a Komatsu 355 bulldozer, a Hough loader and a Hi-Hoe backhoe.

The wash plant consisted of a 5 by 35 foot trommel with 3/8 to 5/8 inch punch plate. A single run sluice under the trommel split into 4 runs which deposited tailings on either side. Water was supplied at the rate of 3500 igpm by a pump, powered by a Cat 3406 engine. Processing rate averaged 160 cubic yards per hour. Seven and one-half cuts were mined in 1988, with the average size of approximately 350 by 300 feet each. The pump pond was fed by the total flow of Maisy May Creek, and effluent was settled in abandoned mine cuts downstream of the operation.

Queenstake Resources operated on Maisy May Creek in 1989 but did not return in 1990. The mine was run as it had been in past years with the cuts moving upstream from where they had finished in 1988.

Fine grained, flat gold was mainly recovered. Nuggets often had quartz attached. Gold fineness averaged 780.

HENDERSON CREEK 115 0 6g
Northway Mining and Exploration 63°26'N 139°5'W
Water Licence: YPM89-067 1989, 1990

Mining for most of 1989 and 1990 was on 60 Pup, a tributary of Henderson Creek, and an unnamed left limit tributary of 60 Pup. 60 Pup is a narrow steep walled creek and mining was done rim to rim as the operations moved upstream.

The deposit is approximately 12 feet deep, although the depth varies between the rim and centre of the creek. An average of 6 feet of frozen black muck overlies 2 feet of sand and 4 feet of gravels. Bedrock tends to be decomposed and granulated with consolidated showing up frequently. The sluiced section consisted of 4 feet of the gravel and very little bedrock. Due to the shallow ground several claims can be mined each year. In 1990 an area 2500 feet long by 100 feet wide was mined on the unnamed left limit tributary of 60 Pup. In addition, a large area downstream near the confluence with North Henderson Creek was stripped and partially sluiced.

Don Sandberg and four other employees worked two shifts of 11 hours in 1990.

Heavy equipment on the property consists of a Cat D9L bulldozer, a Cat D8K bulldozer, a Cat D7F bulldozer, a Cat 988B front end loader and a 225 excavator. The bulldozers were used for stripping and sluicing. In 1989 the 988B loader was used to feed the sluice plant and clear tailings. In 1990 the 225 excavator fed the box and the 988B loader carried tailings away.

The sluice plant used in 1989 was the same one that had been used in previous years. It consisted of a grizzly and a 6 foot diameter trommel. In 1990 a new sluice plant was built. A hopper leading into a 5 foot diameter trommel classifies the pay gravel before spreading out onto four sluice runs 14 feet wide. An electric motor drives an ecentric flywheel which pulsates the riffles. The entire sluice plant was built on a trailor frame which can be pulled to a new site on wheels. The processing rate of the new sluice plant is 90 cubic yards per hour. Water is supplied to the sluice plant by a Paco 8 by 10 inch pump powered by a 471 G.M. motor. Water was pumped from an instream recycle pond downstream from the sluice plant. Additional settling occurs in instream settling ponds downstream from the pump pond.

The gold recovered is primarily fine grained with some medium mesh size. The fineness is 750.

This photo shows Northway Mining's shaker plant being fed by a Cat hoe on Henderson Creek.

NORTH HENDERSON CREEK 115 0 6h
Dave Laurenson 63°28'N 139°13W
Water Licence: YPM88-079 1989, 1990

This one man operation was located on the north fork of Henderson Creek about ten miles upstream from its confluence with the south fork. One Cat D8 bulldozer was used for digging and pushing gravel and for stacking tailings. A Hitachi 5/8 yard backhoe was used to dig drains and to feed the wash plant. The wash plant consisted of a two deck screen, 4 by 4 feet, and a triple run sluice with a 3 foot wide center run with punch plate, expanded metal and angle iron riffles plus two side runs 2 feet wide each by 25 feet long with expanded metal over nomad matting. Approximately 400 gallons per minute was provided by a 4 by 5 inch Fairbanks pump and was used to process from 35 to 40 yards per hour.

The stratigraphic section was up to 20 feet deep with 10 feet of black muck on top of 8 to 10 feet of gravel. Bedrock was very decomposed and clay-like. The bottom 3 or 4 feet of gravel plus 1 foot of bedrock were sluiced. An area approximately 800 by 500 feet was stripped and tested in 1989. A second area 60 by 150 feet was stripped in 1989 and subsequently mined in 1990. Water was pumped from an instream reservoir and settled in one out-of-stream pond and one downstream, instream settling pond.

Gold was chunky with both rough, angular pieces and smooth pieces and had a rusty discolouration. Fineness was between 720 and 760.

MAISY MAY CREEK 115 0 7
Jasper Equipment 63°19'N 138°57'W
Water Licence: YPM89-136 1990

This operation was located on Maisy May Creek approximately 3 1/2 miles downstream from the site Queenstake mined in 1989. 1990 was the first season for Jasper Equipment at this location.

The deposit consists of 10 to 12 feet of frozen materials. Between 4 and 5 feet of black muck overlie 8 feet of gravel. Bedrock tends to be fractured but largely consolidated. Occasional areas of decomposed bedrock are found. The lower 5 to 6 feet of gravel and 6 inches to 1 foot of bedrock is skimmed and sluiced. Five cuts averaging 150 feet wide by 300 feet long were expected to be mined in 1990. Two cuts had been completed by the end of July.

Wayne Lerner and two other employees ran a single shift seven days a week.

A Komatsu 355A-3 bulldozer stripped the cuts and stockpiled pay for sluicing. A Cat EL300 hoe was used to feed the sluice plant and an International Harvester 100C loader carried tailings away.

The wash plant utilized a trommel 5 feet in diameter by 40 feet long to classify the pay to minus 3/4 inches. The pay was then sluiced in six sluice runs with a total width of 20 feet and length of 15 feet. Various combinations of unbacked nomad matting, expanded metal and one inch angle iron riffles were used in the runs. Up to 140 cubic yards was sluiced using 2500 igpm. Water was supplied to the sluice plant by a 10 by 12 inch Paco pump powered by a 671 Detroit diesel engine. Maisy May Creek was channeled into an instream pump pond which also served as a recycle pond. Initial settling was done in old Queenstake Resources instream settling ponds but as the operation moved upstream the mined out cuts were utilized as out-of-stream settling ponds.

Gold recovered was reported to be rounded and rough with very little quartz. Screened size were approximately 5% + 4 mesh, 80% - 4, + 40 mesh, 15% - 40 mesh which indicates the gold was neither super fine or coarse grained. The fineness was 782.

BLACKHILLS CREEK 115 0 7
Paydirt Holdings (1982) Ltd. 63°29'N 138°52'W
Water Licence: YPM87-79RL 1989, 1990

Paydirt Holdings is mining the main valley of Blackhills Creek. Cuts just downstream of Childs Gulch were mined in 1989 with the operation moving upstream of Child's Gulch in 1990.

Paydirt Holdings (1982) Ltd. Blackhills Creek.

The stratigraphic section remained relatively constant as mining progressed upstream. On average, 12 feet of frozen black muck overlies an 8 foot layer of frozen gravels. Bedrock is fractured to a depth of 2 feet. The lower 3 feet of gravel and up to 2 feet of the bedrock were sluiced. The upper gravels do not contain gold. On average two to three claims have been mined each season. In 1989 three cuts 300 feet wide by 500 feet long were mined. In 1990 a cut 200 feet wide by 350 feet long and a cut 200 feet wide by 400 feet long had been mined with two more similar cuts expected before the end of the season.

A crew of nine, including the site managers and cook, ran the mine on a double shift in 1989. One additional employee was hired for the 1990 season.

Two Cat D9H bulldozers were used for stripping the cuts and stockpiling pay for sluicing in 1989. In 1990 a third Cat D9H bulldozer was acquired for the same purpose. Two Cat Bulldozers, a D8H and D8K, were used as spare machinery or for any odd jobs. Tailings were hauled away and ramped with two Cat 966 loaders and a Cat 980C loader. A Cat 235 hoe fed the sluice plant.

A derocker feeding a single 42 inches wide by 30 foot long sluice run was used in 1989. In order to increase production in 1990 two derockers side by side were used each feeding a 42 inches wide by 70 foot long sluice run. The 235 hoe fed both derockers from the same location. Water was pumped to the two derockers by two 10 by 12 inch pumps powered by 3208 Cat engines. Production in 1989 was estimated at 80 cubic yards per hour. With two derockers working in 1990 production rose to 150 cubic yards per hour. Water was pumped from instream recirculation ponds constructed from previous cuts. Effluent outflow was usually by seepage from the first pond. Additional settling occurred in other downstream instream ponds.

Approximately 40% of the gold is + 8 mesh with the remainder being fine grained and flat. Quartz is common on the nuggets. The fineness varies between 730 and 750.

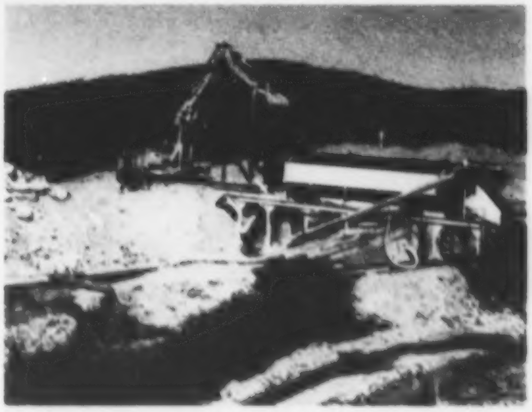
BLACKHILLS CREEK 115 0 7
Queenstake Resources 63°27'N 138°50'W
Water Licence: YPM87-030RL 1989

Queenstake Resources had two operations on Blackhills in previous years but only the upper one ran in 1989. The camp was closed in the fall of 1989 and Queenstake did not return in 1990.

Two cuts on a left limit bench of Blackhills Creek were mined in 1989. Both cuts measured 400 feet long by 300 feet wide and averaged 30 feet of frozen material to bedrock. An average stratigraphic profile consisted of 12 feet of mud over 12 feet of coarse red gravel and 6 feet of white gravels. Up to 12 feet of the lower gravel and 1 foot of bedrock were sluiced.

A crew of three men and a cook ran the operation.

The wash plant consisted of a 4 by 30 foot trommel lined with 3/4 inch punch plate. The classified pay was fed into three 32 inches by 18 foot sluice runs. The sluce runs were lined with coco matting and expanded metal. Using 1500 igpm of water approximately 85 cubic yards per hour could be sluiced. Water was delivered by a 10 by 12 inch Morris pump powered by a 3406 Cat engine to the sluice plant from an instream pump pond on Blackhills Creek. Effluent was settled in an instream pond in the main valley.



A 225 Cat hoe is feeding a hopper at the head of the trommel, at Queenstake's placer operation on Blackhills Creek.

A Cat D9H bulldozer stripped the cuts and stockpiled the pay next to the sluice plant. A Cat 225 hoe fed the hopper on the sluice plant. Either the D9H or a Cat 930 loader cleared tailings.

The gold is mainly fine grained (95% - 12 mesh) and flat. Fineness is 780.

CHILDS GULCH 115 0 7l/115 0 10c
Dorados Development Ltd. 63°30'N 138°50'W
Water Licence: YPM88-122 1989, 1990

This mine is located on Childs Gulch, a left limit tributary of Blackhills Creek. Mining has progressed upstream from the confluence of Childs Gulch and Blackhills since 1986.

The stratigraphic profile averages 16 feet and is frozen throughout. This company is mining a narrow, steep walled gulch so depths near each limit are deeper to bedrock than the center of the valley. On average 8 to 10 feet of black muck overlies 8 feet of gravel. Bedrock is found in a decomposed state but usually is fractured consolidated material. In 1989 the entire gravel layer was sluiced but in 1990 the lower 5 feet were sluiced with the upper 2 to 3 feet of gravel wasted. When possible, between 2 and 4 feet of the bedrock was sluiced. A total of seven cuts averaging 350 feet in length by 150 feet wide were stripped and sluiced in 1989. Five cuts averaging 200 feet long by 150 feet wide were stripped and sluiced in 1990. Both overburden and tailings were ramped with the bulldozers onto the limits.

In 1989 there was a staff of seven including the cook and mine manager, Roy Wallin. There was a staff of ten in 1990 including the cook and mine manager.

Two Komatsu D355A bulldozers and a PC300 hoe were used for mining. The bulldozers stripped the cuts, pushed pay to the sluice box and cleared tailings up onto the limits. The PC300 hoe was used for feeding the sluice plant. A derocker removed the larger rock before the pay was passed through a model 300 Ross Box. A rubber mat in the dump box and another mat at the beginning of the main run spreads the water flow across the run and washes the pay better. Between 150 and 180 cubic yards of gravel were washed per hour using 3500 igpm of water. A 12 by 10 inch Morris pump powered by a 3406 Cat engine supplied water to the sluice plant. Water was pumped from a horseshoe shaped settling/recycle pond to the sluice plant. Settling facilities are instream, old cuts are used for settling as the operation moves upstream.

The gold has tended to decrease in mesh size as the operation moves upstream. The majority of the gold is around 20 mesh size. The fineness is 750 and has remained constant.

EUREKA CREEK 115 0 10c
Discovery Creek Gold Placers 63°35'N 138°52'W
Water Licence: 1989, 1990
YPM88-117
YPM89-082

This company mined at the confluence of the left and right fork of Eureka Creek in 1989. The sluicing operation moved upstream on the left fork in 1990 while testing occurred on the right fork.

The stratigraphic section was comprised of 1 foot of organics covering 12 feet of frozen black muck and 6 feet of frozen gravels. The bedrock varies from solid bedrock reefs to totally decomposed. All of the gravel strata was sluiced along with 2 to 3 feet of bedrock where possible.

Two full time miners ran a single shift in 1989 and 1990.

Three cuts were mined in 1989 with the largest being 400 by 300 feet. The cuts were stripped mechanically in 1989 but both hydraulic monitoring and mechanical stripping were done in 1990.

Two Cat D9 bulldozers were used for stripping, feeding the sluice plant and pushing tailings. A Cat D8 bulldozer was also available where needed.

A Ross Box model 500 sluice box continued to be used. The dump box measured 20 by 15 feet. The lower section was lined with monsato matting, expanded metal and punch plate. The washed pay then passes into the main run and branches off to two side runs. Monsato matting and expanded metal lines the side runs while monsato matting and flat bar riffles are used in the main run. The sluice plant had an operating capacity of 100 - 150 cubic yards per hour.

A 12 by 14 inch pump powered by a Cat diesel engine (D8 size) supplies the 4000 igpm of water needed for sluicing and hydraulic monitoring. In 1989 a system where a primary settling pond, a second instream settling pond/recycle pond and a third large instream settling pond for final effluent treatment was used. Water was recycled in 1990 for the sluicing operation and was settled in several large instream settling ponds on the left fork.

The gold was reported to be fine grained and rounded with no quartz. The fineness was 690.

MONTANA CREEK 115 0 10d
Rivest Bros. 63°38'N 138°59'W
Water Licence: YPM88-073 1990

This operation is approximately 6 miles upstream from the mouth of Montana Creek which is a tributary of the Indian River.

Two miners worked a single ten hour shift to mine this property. A 825 Bobcat was used for all activities.

An average of seven feet of overburden was removed with the remaining three feet of gravels and one foot of decomposed schist bedrock being sluiced at an approximate rate of twelve cubic yards an hour using 250 imperial gallons per minute. Water was supplied from a recycling pond, by a Honda 8 HP, 3/4 inch pump.

Gold was reported to vary from fine grained to coarse. Fineness was 770.

EUREKA CREEK 115 0 10e
Edgewater Exploration 63°37'N 138°52'W
Water Licence: YPM87-110L 1989

Edgewater Exploration mined on Eureka Creek approximately 1 1/2 miles upstream from its confluence with the Indian River. The company mined on a large scale throughout 1989 but did not return in 1990.

Many different cuts were mined in several areas so it is difficult to give an average stratigraphic description. At the time of inspection a right limit cut opposite the main camp was being mined. The deposit averaged 16 feet deep and was frozen throughout. Eleven feet of black muck overlies 5 feet of gravel. Bedrock is highly fractured. The entire gravel strata and 6 inches of bedrock were sluiced. Three main cuts were sluiced in 1989. The first measured 1100 feet long by 300 feet wide by approximately 30 feet deep. The second cut measured 3000 feet long by 50 feet wide and the third cut measured 900 feet long by 100 feet wide.

This company ran one of the largest operations in the territory. Fourteen miners plus a welder, a mechanic and a cook ran a double shift.

Four Fiat Allis HD31 bulldozers were used for stripping. Three 637D scrapers also stripped and were used to carry pay to and tailings away from the sluice plant. A Cat D9H bulldozer was used for stripping and when needed as a push dozer for the scrapers. A 235 hoe fed the sluice plant and dug drains where needed. A Cat grader was also kept to maintain roads.

A Ross 500 sluice box was used. Close to 300 cubic yards per hour were sluiced with an estimated 7000 igpm of water. Water was pumped to the sluice plant by a 12 by 10 inch Morris pump powered by a 3406 Cat diesel engine. Water was pumped from an instream pumping/settling pond which captured total creek flow. A series of three settling ponds served as a recycle system with some outflow from the first settling pond.

The gold recovered was mainly fine grained. The fineness was 720.

INDIAN RIVER 115 0 13e
Caribou Mines 63°36'N 138°34'W
Water Licence: YPM89-042 1990

This property is located on the Indian River at the mouth of Dominion Creek.

The deposit was 14 feet deep and frozen to bedrock and consisted of 5 feet of black muck on 9 feet of river gravels.

Heavy equipment included two Cat D9 bulldozers and one Cat D8 bulldozer which were used to strip the cut and stockpile pay. A Cat 225 hoe was used primarily for feeding the wash plant and putting in bedrock drains.

The wash plant consisted of a triple run sluice box. Material was screened to minus 1/2 inch by punch plate over riffles.

Sixteen persons worked on a double shift basis in 1990.

The plant was fed at a rate of 150 cubic yards per hour. Sluice water was delivered by a 10 by 12 inch Morris pump, powered by a Cat 3406 diesel.

Gold was described as being flakey. Size ranged from fine grained to small nuggets. Fineness was reported to be 830.

DOMINION CREEK 115 0 10e
Airgold 63°37'N 138°43'W
Water Licence: YPM87-173 1990

Twenty two miners working two ten and a half hour shifts mined this property.

A Cat D9L bulldozer, a Komatsu 445A bulldozer and a Cat 631E scraper were used for stripping. To feed the sluice box a Komatsu WA600 loader and a Cat 966 loader were used. A Cat 235 excavator was used for drain work with another Cat 966 loader as a back-up machine.

The deposit consisted of 35 feet of frozen black muck over six feet of pay gravels. All 6 feet of pay gravel plus two feet of bedrock were sluiced.

This operation used two sluice plants to process gravel at a combined rate of 244 cubic yards per hour. Each sluice plant consisted of a triple run Ross box equipped with punch plate in the mouth and centre runs and expanded metal over nomad matting in the side runs.

Fineness of gold recovered was 840.

DOMINION CREEK **115 0 10f**
Queenstake Resources **63°40'N 138°37'W**
(L.W. Gatenby) **1990**
Water Licence: YPM89-175

Queenstake Resources operated under L.W. Gatenby's water use licence YPM89-175 and a lease agreement.

Eight miners worked two eleven hour shifts. Three Cat D9H bulldozers were used to strip overburden and push pay gravels to the sluice plant. A Cat D8H bulldozer removed tailings and a Cat EL300 excavator fed the sluice plant.

The deposit consisted of twelve feet of black muck and ten feet of gravel over eight feet of White Channel gravel, all of which was frozen. The White Channel gravel and two to three feet of decomposed schist bedrock were sluiced at a rate of 250 cubic yards per hour.

The wash plant consisted of a trommel six feet in diameter screening to minus 3/4 inch, a nugget trap and four side run sluices with expanded metal and nomad matting. Water was used at a rate of 2000 igpm.

Gold recovered had a fineness of 790.

LOWER GOLD RUN CREEK **115 0 10g**
Teck Mining Group **63°43'N 138°37'W**
Water Licence: YPM86-105L **1989**

Teck employed 17 miners with 5 other related camp personnel working two 10 hour shifts.

Teck utilized two 637 scrapers to strip waste, haul pay and remove tailings. A Cat 966 loader was dedicated to sluicing duties. There were also two 235 backhoes which dug ditches, drains and cleaned bedrock.

The wash plant was a screen deck which fed a triple-run sluice box. The center run had punch plate at the feeder and expanded metal over nomad matting continuing down the rest of the main run. Expanded metal over nomad matting made up the two side runs. Two pumps, an 8 by 10 inch Cornell 3406 and an 8 by 10 inch Morris 3306 slurry pump, pumped 3500 igpm to process 130 loose yards per hour.

The stratigraphic section has a total depth of 30 feet, all of which is frozen. There is approximately 25 feet of overburden covering 5 feet of pay gravels which overlay the fractured and decomposed bedrock. Approximately 2 to 3 feet of the decomposed bedrock is sluiced with the pay gravel. Coarse waste is stockpiled and the fine waste is settled in settling ponds. There was one expanding cut this year with a measurement of 250 by 1000 feet. Seepage from the right valley limit was collected in a large recirculation pond and was used to process the pay gravel.

Restoration works, resloping and grading of waste material at this site are exemplary. This operation is one of the larger ones in the territory.

The gold recovered from this area is generally fine grained with a fineness of 830.

DOMINION CREEK **115 0 10g**
Ross Mining Services **63°41'N 138°38'W**
Water Licence: YPM87-024 **1990**

Nine miners working two ten hour shifts mined this property using a Cat 245 excavator, Komatsu PC400 excavator, three Cat 769 rock trucks, a Cat D10L, Cat D9L, Cat D8L and a Cat 988 loader.

Two wash plants were used; a Ross 500 and Ross 1000. They processed pay gravel at a combined rate of 150 to 300 cubic yards per hour. Water was supplied by a 20 by 24 inch pump powered by a Cat 398 engine and a 10 by 12 inch pump powered by a GMC 671 engine at a combined rate of 6,000 igpm.

The deposit consisted of 35 feet of black muck covering 30 feet of gravel. The lower 5 to 15 feet of gravel plus 2 to 3 feet of bedrock were sluiced.

Fineness of gold recovered was reported as 850.

DOMINION CREEK **115 0 10g**
Consolidated Mines **63°41'N 138°36W**
Water Licence: YPM86-159L **1989, 1990**

This four person operation was located at the lower end of Dominion Creek below its confluence with Gold Run Creek. One Cat D8K and two Cat D8L bulldozers were used to dig and push gravel as well as to feed the wash plant and to remove and stack tailings. One 637 belly loading scraper was used to transport pay gravel. The wash plant was a triple run Ross Box. A 12 by 14 inch Peerless pump, powered by a 1150 Cummings diesel, delivered about 6000 gallons per minute.

The stratigraphic section near the center of the valley bottom of Dominion Creek had peat and brush vegetation on top of 15 feet of black muck over a gravel layer that was up to 40 feet deep toward the sides. Bedrock was decomposed but had very little clay. Water was recycled in large, out-of-stream, settling ponds.

Gold was mostly fine grained with fineness around 860.

SULPHUR CREEK 115 0 10h
Henry Kruger 63°42'N 138°47'W
Water Licence: YPM86-154RL 1989, 1990

Henry Kruger was mining in the main Sulphur Creek valley on the right limit side. An upstream expanding cut was mined in 1989 and 1990.

The stratigraphic section averaged 35 feet through frozen material to bedrock. A 14 foot layer of black muck overlies 21 feet of gravel. Bedrock tended to be decomposed. The upper gravels were poor in pay but because enough gold was recovered to cover the costs of moving it the entire gravel layer was sluiced along with 6 inches of the bedrock. A single cut 20 feet wide by 150 feet long was stripped and sluiced in 1989. A larger cut, 60 feet wide by 150 feet long, was mined in 1990. A 30 foot wide by 150 foot long cut was partially stripped in 1990 as well.

Henry Kruger has run this operation by himself since 1989.

A Hugh 120 loader, a Cat 955 loader, a Koering 605 dragline and a Cat D7E bulldozer were used in 1989 and 1990. The stripping was done with the 120 loader primarily with the D7E bulldozer to loosen the lower gravels. The sluice plant was fed and the tailings cleared away with the 120 loader. The 605 dragline hoisted pay and stockpiled it during 1989 but was not used in 1990. The 955 loader was used for various chores but was rarely used for mining.

A dump box feeding a three run sluice box was used in 1989 and in 1990. A 13 foot wide by 8 foot long dump box narrows down to a 3 foot neck. The lower section of the dump box is lined with 1/2 inch punch plate with 2 by 4 splitters to channel any minus 1/2 inch pay into a side run on each side of the main run. An H-beam is suspended in the dump box to hold back muck to ensure it gets adequately washed. The center run measures 3 feet wide by 24 feet long. Coco matting, double expanded metal and 1/2 inch punch plate line the entire run. The side runs increase in width from 3 to 4 feet near the top and are 24 feet long. Coco matting and double expanded metal are used in the side runs. Production is estimated to be 50 cubic yards per hour. Between 1500 and 2000 igpm are needed for sluicing. When conditions are dry water needs to be recycled out of the cuts which were mined over the last few years and have filled with water. Normally, water from a pond beside Sulphur Creek is pumped to the sluice box. The settling facilities have been built out of old dredge tailing and outflow is by seepage only.

The gold was reported as mainly fine grained and flaky. Fineness is 820.

BRIMSTONE GULCH 115 O 10i
(SULPHUR CREEK) 63°44'N 138°51'W
W. D. Groner 1989, 1990
Water Licence:
YPM87-124L
YPM89-144

This operation is located at the mouth of Brimstone Creek, a tributary of Sulphur Creek. Mr. Groner himself continued mining this ground in 1989 and 1990 on a small scale. One expanding cut is being worked on.

The deposit being mined is approximately 20 feet deep. An average of 2 feet of frozen black muck overlies 10 feet of frozen silt and ice lenses with up to 8 feet of gravel on top of bedrock. Bedrock varies considerably in a small area from highly decomposed clays and sands to a fractured consolidated form. The entire gravel strata was found to contain gold and was sluiced along with 2 feet of the fractured bedrock. A cut approximately 100 by 200 feet was stripped and sluiced in 1989 and again in 1990. A portion of the 1989 cut was sluiced in 1990 and part of the 1990 cut remains to be sluiced in 1991.

Most of the overburden is stripped by a hydraulic monitor. Using a Cat D4 bulldozer Mr. Groner finishes the stripping, stockpiles pay, feeds the sluice box and clears tailings. A Cat D9 is brought in under contract when a larger piece of equipment is required for stockpiling.

A conventional single run sluice box was used. The dump box measured 4 feet wide by 12 feet long. The monitor directed against the stockpile washes the pay into the sluice run. The dump box is just slick plate leading into a 2 foot wide by 30 foot long sluice run. Coco matting with a double layer of expanded metal sits beneath punch plate of various sizes and types. A best guess estimate of 10 yards per hour maximum was sluiced using approximately 500 igpm pumped by a 6 by 5 inch Peerless pump powered by a D4 Cat engine. Water for sluicing and monitoring is pumped from an instream pond on Brimstone Creek. Effluent from the monitoring operation is settled in the Sulphur Creek Community Settling Pond built in old dredge tailings adjacent to Sulphur Creek. Effluent from the sluicing is settled in the pump pond which serves as a recycle/settling pond.

Gold recovered in 1989 and 1990 was reported to be primarily fine grained with two seemingly distinct types. Gold believed to have come from Brimstone Creek is rough and blocky while gold believed to be from Sulphur Creek is flat and smoother. Very little quartz is found attached to the gold. All gold is sold together and a fineness of 830 was reported.

This photo shows Mr. Groner hard at work mining his Sulphur Creek property.

ROSEBUTE CREEK **115 0 11**
Torfinn Djukastein **63°34'N 138°21'W**
Water Licence: YPM89-135 **1990**

This operation started mining an unnamed tributary of Rosebute Creek in 1990.

The deposit was found to be relatively shallow and frozen. Since this creek is narrow and has high run-off, a creek channel was left on the right limit in order to bypass the stripping, sluicing and settling areas. For that reason the left limit and center of the creek were the only areas mined. Several cuts averaging 75 feet wide by 200 feet long were sluiced. Three cuts had been finished at the time the operation was inspected.

Torfinn Djukastein, his wife and a single employee ran the entire operation.

A Cat D7E bulldozer was used for all the stripping and to feed the sluice plant. A Cat 966B loader was used to carry away and stack tailings and any other chores where it was needed.

The sluice plant consisted of a derocker to classify the pay to minus 2 inch for a single sluice run. Water for sluicing was gravity delivered from an instream pond above the uppermost cut to the sluice plant. Two spray bars in the derocker washed the pay. Effluent treatment was provided by out-of-stream settling ponds downstream. As the operation had moved upstream mined out cuts were available for additional settling ponds.

At the time of inspection very little information was available about the gold except that it was primarily fine grained. The fineness was not determined.

Derocker being fed by a D7 bulldozer at T. Djukastein's mining operation on Rosebute Creek.

INDIAN RIVER **115 0 11g**
Gold City Resources **63°44'N 139°08'W**
Water Licence: **1990**
YPM88-058
YPM88-060
YPM89-038

Gold City Resources Ltd. mined in three locations along the Indian River. Twelve miners and three others worked two twelve hour shifts. The deposit consisted of four feet of black muck over eleven feet of gravel with schist bedrock. Three feet of gravel and one foot of bedrock were sluiced using triple run Pearson Rock boxes at a rate of 150 cubic yards an hour. Gould 12 by 12 inch pumps powered by Cat 3408 engines supplied water at a rate of 3500 igpm.

Heavy equipment used were two D10N Cat bulldozers and one Komatsu 355 bulldozer.

Gold recovered was fine grained to flaky with few nuggets. The fineness was 780.

INDIAN RIVER 115 0 11g/115 0 14b
Estabrook Mining 63°45'N 139°08'W
Water Licence: YPM89-111 1990

This property is located on the Indian River near the mouth of Quartz Creek. The deposit, which is frozen, is at an average depth of 20 feet. The section sluiced consisted of the bottom 3 feet of gravel and 2 feet of bedrock.

Ten miners ran the operation on a single shift basis in 1990.

The ground was stripped and pay gravels pushed up by a Cat D9L bulldozer. A Cat 980C loader and a Cat 966 loader were used to feed the wash plant and remove tailings.

A triple run conventional sluice box was used to wash pay gravels at a rate of 150 cubic yards per hour. Approximately 5,000 igpm of water was supplied by an 10 by 12 inch pump powered by a Cat 3408 diesel.

Two large cuts were mined in 1990. The first measured 400 by 900 feet. The second measured 300 by 600 feet. Total excavated volume was approximately 400,000 cubic yards. Processed volume was about 100,000 cubic yards.

The gold was described as being fine grained and with an average fineness of 790.

INDIAN RIVER 115 0 11g
Kodiak Gold 63°44'N 138°09'W
Water Licence: YPM87-159 1990

This operation is situated on the Indian River near Quartz Creek. The deposit, which is 12 feet deep, consisted 4 feet of black muck overlying 8 feet of gravel on bedrock. The total section was frozen.

A single ongoing cut was mined. Materials were handled by two Cat D9L bulldozers and one Koehring 1166 hoe. The property was mined on a double shift basis by 8 persons.

Four hundred and fifty cubic yards per hour of gravel were washed using 4500 igpm in a three channel sluice box. The process water was delivered by a 14 by 14 Gould pump powered by a Cat 3408 diesel.

Gold was described as being flat and fine grained, with an average fineness of 780.

LITTLE BLANCHE CREEK 115 0 14
Irv Nafziger 63°51'N 139°08'W
Water Licence: YPM89-079 1990

This operation is the upper most mine on Little Blanche Creek. The stratigraphic section, which is 15 feet deep, was described as having 10 feet of black muck overlying 5 feet of gravels on bedrock.

The property was mined on a single shift basis by Mr. Nafziger and one other miner.

Heavy equipment included two Cat D8H bulldozers used for stripping and pushing up pay gravels and a Cat 225 hoe used for feeding the wash plant and ditching.

A derocker wash plant with 2 three foot wide by 20 foot long sluice runs were used for processing 75 cubic yards of gravel per hour. Water was supplied by a 6 by 8 inch pump powered by a 371 Jimmy diesel.

Gold was reported to have a fineness of 650.

HESTER CREEK 115 0 14
Tony Fritz 63°59'N 139°03'W
Water Licence: YPM87-115L 1989/1990

This operation was working at the mouth of an unnamed left limit tributary of Hester Creek. This was a small scale operation. Very little has occurred since 1984 when the first licence for this ground was issued to Tony Fritz.

The depth to bedrock has not been determined. Each year further stripping is done but problems with upstream erosion have prevented the cut from getting to bedrock. A few hours of sluicing were done in 1989 but no sluicing occurred in 1990. Tony Fritz runs this operation by himself.

No gold has been recovered yet.

HUNKER CREEK 115 0 14
Hilltop Mining Partnership 63°59'N 139°02'W
Water Licence: YPM89-145 1989, 1990

This property is located on Nugget Hill, a left limit bench of Hunker Creek between Independence and Hester Creeks. The Gould family mined the ground from 1903 to 1988 before leasing it out to Hilltop Mining Partnership.

Two separate areas were mined in 1989 and 1990. The stratigraphic profile varies considerably from cut to cut. Up to 35 feet of frozen material sits on bedrock. The black muck varies from 12 to 24 feet with an average of 15 feet of White Channel gravel beneath. The upper 5 feet of gravel was found to be non-paying and is stripped off without sluicing. The lower 10 feet of gravel and between 6 inches to 2 feet of bedrock is sluiced. The bedrock varies from gumbo clays to shattered consolidated. Reefs in the bedrock reduce this average profile when present.

Four miners, a cook and the mine manager, Charlie Friday, operated a single 14 hour shift six days a week in 1989 and 1990.

In 1989 an International TD25 bulldozer, a Cat 966 loader and a Cat 627 scraper were used. The TD25 bulldozer was used for stripping and scraping pay. The 966 loader fed the sluice plant and cleared tailings. The 627 scraper was used for stripping and moving pay. In 1990 a Fiat-Allis 31 bulldozer and an Hitachi UH20 hoe were added. The Fiat-Allis bulldozer was used for stripping and the TD25 bulldozer switched to clearing tailings. The 966 loader continued to feed the sluice plant. The UH20 hoe served where needed.

The sluice plant consists of an elevated dump box feeding a trommel (scrubber). The trommel measures 5 1/2 feet in diameter by 44 feet long. The pay gravel is classified to - 3/4 inch with over size material passing out the end directly as tailings. The pay gravel then passes through two suspended oscillating sluice runs 4 feet wide by 20 feet long. The sluice runs are lined with nomad matting and expanded metal. The tailings off the end of the sluice runs were channeled into a sand screw to dewater and remove fines. In 1989, the effluent then flowed into a large settling pond/recycle system. In 1990 the effluent was settled in out-of-stream settling ponds beside Hunker Creek and the sand screw was not used. A Cornel 8 by 6 inch pump powered by a 3208 Cat engine pumps water from an instream pump pond on Hunker Creek to the holding ponds on Nugget Hill. An electric submersible 6 inch pump supplied water to the sluice plant. A 70 KW generator powered both the submersible pump and the wash plant. Final effluent treatment was provided in the Hunker valley bottom in 1989 and 1990 with large out-of-stream settling ponds. Out flow back to Hunker Creek was by seepage only.

The gold was reported to be primarily fine grained and rounded. Quartz was common in much of the gold. The largest nuggets were between 2 and 3 grams and are rare. Fineness is 840.

UPPER BEAR CREEK 115 0 14
Russell Placers 63°59'N 139°15'W
Water Licence: YPM88-118 1990

This property is located on the upper reaches of Bear Creek, approximately 4600 feet upstream of its confluence with Lindow Creek. The valley at this same location is narrow with steep gradient and steep side walls.

In 1990 the property was operated by Russell Placers on a single, full time shift.

Heavy equipment included one Case W18 loader used for feeding the wash plant and removing tailings. One Case 450 track loader with 580 hoe was used primarily to dig drains and push up pay gravel.

Gold recovered had a fineness of 700.

INDEPENDENCE CREEK 115 0 14
Tony Kosuta 63°59'N 139°01'W
Water Licence: YPM88-123 1989, 1990

This property is situated at the mouth of Independence Creek, a left limit tributary of Hunker Creek. Gravels from several areas were tested throughout 1989 and 1990 in an effort to locate a pay zone.

The deposit was approximately 30 to 35 feet to bedrock which had only been reached in an exploratory hole. Alternating layers of largely thawed black muck and gravel were found in all cuts. Material from all depths has been sluiced in the bulk testing program. No full cuts have been stripped and sluiced. Tony Kosuta ran this operation by himself.

The sluice plant is a conventional dump box and single sluice run. The 8 foot wide by 10 foot long dump box tapers to 24 inches at the throat and feeds the 24 inch wide by 36 foot long sluice run. Production is estimated at a maximum of 45 cubic yards per hour. Water for sluicing is pumped from an instream pond on Independence Creek or the out-of-stream test pits which fill with run off water. An 8 by 6 inch pump powered with a D4 Cat engine supplies water to the sluice box.

The effluent flows into an area of old dry dredge tailings. Outflow is by ground seepage only.

Gold recovered has been fine, rounded and rough. Fineness is 800.

INDIAN RIVER	**115 0 14a**
John Zacharias	**63°46'N 139°08W**
Water Licence: YPM89-128	**1989**

This small scale, two person operation was located on the Indian River near the mouth of Quartz Creek in 1989 but did not operate in 1990. One Cat D7 bulldozer was used to strip overburden and dig gravel and one Cat 966 front end loader was used to feed pay gravel into the wash plant. The wash plant was a dump box with punch plate followed by double sluice runs with angle iron riffles over nomad matting. Two small water pumps (one 6 by 6 inch and one 4 by 4 inch) powered by gasoline engines provided up to 1000 gallons per minute which were used to process about 40 cubic yards per hour.

The mining cut was only 6 feet deep with about 3 feet of waste overburden on top of 2 or 3 feet of pay gravels. All gravel plus about one foot of bedrock were sluiced from a mining cut approximately 50 feet wide by 300 feet long. Water was pumped from the Indian River and was settled in out-of-stream settling ponds with seepage discharge only.

Gold recovered was mostly fine grained with some quartz. Fineness was 780.

LITTLE BLANCHE CREEK	**115 0 14a**
H. Milier	**63°51'N 139°08'W**
Water Licence: YPM89-083	**1990**

One miner, using a P & H dragline with 1.25 cubic yard bucket to excavate drains and a Cat D82U bulldozer for stripping and pushing to sluice box, mined this property.

The wash plant consisted of a long tom and dump box with punch plate. Water was supplied at a rate of 1200 igpm by a 6 inch GMC Trash pump.

The ground varied from six to twelve feet of black muck covering one to four feet of pay gravels. All gravels plus two feet of bedrock were sluiced at a rate of 35 cubic yards per hour.

Gold recovered was 95% coarse with a fineness of 710.

UPPER QUARTZ CREEK	**115 0 14a**
Schmidt & Tatlow	**63°49'N 139°04'W**
Water Licence: YPM86-143	**1990**

This operation is located on Upper Quartz Creek. The deposit, which was frozen to bedrock, was 20 feet deep. It consisted of 6 feet of black muck overlying 14 feet of gravels. The sluice section consisted of the lower 6 feet of gravels and 3 feet of bedrock.

Mr. Schmidt and Mr. Tatlow and 20 other persons worked the property on a single shift basis in 1990.

Heavy equipment on the property included two Cat D10N's one Cat D9L and one Cat D9G, all were primarily used to strip overburden and feed the wash plant.

The washing plants consisted of three triple run sluice boxes. The processing rates were 225 to 250 cubic yards per hour with water use of 4,500 igpm, supplied by three Morris 10 by 12 inch pumps powered by 3408 Cat diesel engines.

The gold was described as being extremly varied in size, with a fineness of 800.

INDIAN RIVER	**115 0 14b**
Gold Valley Joint Ventures	**63°47'N 139°15'W**
Water Licence: YPM88-047	**1989, 1990**

This operation was located in the Indian River valley on the left limit bench upstream of Ophir Creek. Eight miners worked two ten hour shifts. Equipment used includes a Fiat-Allis bulldozer, a Cat D9L bulldozer and a Cat D10N bulldozer. The equipment was used to strip overburden, dig and push gravels, feed the wash plant and remove and stack tailings. The wash plant had a 16 by 24 foot dump box with triple sluice runs; the center run was 4 feet wide by 16 feet long with angle iron riffles. Both side runs were 6 feet wide by 16 feet long with expanded metal over nomad matting. Up to 150 cubic yards of gravel were processed per hour. A 10 by 10 inch pump, powered by a Cat 3408 diesel, provided approximately 3000 igpm.

The stratigraphic section in the wide valley bottom was a layer of overburden varying from 6 feet deep near the middle to 15 feet deep on the sides sitting on decomposed bedrock. The bottom 2 feet of gravel plus 2 feet of bedrock were sluiced. On the left limit bench overburden was only 2 to 4 feet deep and the gravel layer was up to 8 feet deep.

Water was recycled from an old mining cut in the valley bottom. For the bench operation, make up water was pumped directly from the Indian River to a recycle pond on the bench.

Gold recovered was a mixture of fine and coarse gold with some nuggets, some were bright yellow and flattened and some were chunky and stained dark. Fineness was around 840.

FRENCH GULCH/ 115 0 14e
ELDORADO CREEK 63°55'N 139°19'W
Henry Reinink 1989, 1990
Water Licence: YPM88-121

This property was located in the left side of the valley bottom of Eldorado Creek below Gold Hill, immediately upstream of the mouth of Eldorado Creek at Grand Forks. The ground was sub-contracted to Carson Gold in 1989 who ran a four man operation. One Cat D9H bulldozer and a 1 1/2 yard bucket backhoe were used to strip overburden and dig pay gravel. A scraper was used to haul pay gravel and a 5 yard bucket front end loader was used to feed the wash plant and remove tailings.

The wash plant was a derocker with a single sluice 4 feet wide by 15 feet long with 1 inch punch plate and expanded metal at the top and standard angle iron riffles at the bottom. A 10 by 10 inch Lister pump delivered about 2000 gallons per minute of water which was used to process about 60 to 70 yards per hour.

The mining cut at the base of the hillside on the left side of the valley bottom had from 6 to 8 feet of black muck overburden on top of 6 to 8 feet of gravel laying on bedrock. All gravel plus 2 or 3 feet of bedrock were processed. Waste overburden was stockpiled and later spread over recontoured tailings piles. Dimensions of 1989 mining cuts were approximately 50 feet wide by 100 feet long and 30 feet wide by 60 feet long.

Waste water was recycled in out-of-stream settling ponds.

Gold was mostly fine grained with some small flattened nuggets and assayed at about 750.

FRENCH GULCH 115 0 14e
ELDORADO CREEK 63°54'N 139°19'W
James Archibald 1989, 1990
Water Licence:
YPM86-035RL
YPM89-133

This one man operation continued in 1990 near the mouth of French Gulch, a left limit tributary of Eldorado Creek. In the bottom center of French Gulch an overburden layer about 12 to 14 feet deep was removed mechanically using a Cat D8K bulldozer. This overburden consisted of black muck with seams of sand and silt. The gravel layer averaged about 8 feet to Klondike schist bedrock. All of the gravels plus up to 6 feet of the decomposed top layer of bedrock were sluiced.

The wash plant was an 8 by 12 foot dump box and single run sluice 36 inches wide by 24 feet long. Standard angle iron riffles were used in the sluice and at the bottom end of the dump box. A 10 by 12 inch Byron-Jackson pump powered by a 671 Detroit diesel engine delivered approximately 2500 gallons per minute which was used to process about 70 yards per hour.

One Cat 980B front end loader was used to feed the sluice box, remove and stack tailings, and to clean out the settling ponds. One Cat D6B bulldozer was used for pushing gravel and for feeding the sluice box.

Cleaning out a settling pond on James Archibald's placer operation on French Gulch using a Cat 980B loader.

Water was stored in a reservoir on French Gulch and waste water was contained in two, large, out of stream settling ponds between the mouth of French Gulch and Eldorado Creek. Discharge water from the settling ponds flowed into French Gulch.

Gold was angular and coarse grained with 50% minus 12 mesh and a fineness of 690.

ELDORADO CREEK & 27 GULCH 115 0 14e
Eldorado Mining 63°53'N 139°18'W
Water Licence: YPM89-100 1989

The last year of mining on Eldorado Creek was 1989. Dave Johnson moved his operation to Hunker Creek in 1990 after completing cleanup and restoration of the Eldorado Creek and 27 Gulch operations.

During 1989 four miners worked a single shift.They used three Cat D8 bulldozers to dig and push pay gravels and tailings and one Cat 920 front-end loader to feed the wash plant.

The wash plant was a derocker with triple sluice runs which processed up to 120 yards per hour. A 10 by 12 inch pump powered by diesel, delivered approximately 4000 gallons per minute from a recycle pond in Eldorado Creek. The sluice box was set up at the mouth of 27 Gulch, a right limit tributary. Pay gravels and bedrock were excavated from 27 Gulch valley bottom and left limit bench. Final dimensions of pay cuts were approximately 100 feet wide by 1000 feet long on the left bench. The stratigraphic section was 8 to 10 feet of overburden and gravel in the 27 Gulch valley bottom but very little of either on the bench. Bedrock was very decomposed and was ripped and sluiced to a depth of 10 feet on the bench and 15 feet in the valley bottom.

Gold recovered was rough and jagged with lots of quartz attached and many chunks and nuggets with a fineness of 750.

ELDORADO CREEK & 115 0 14e
ORO GRANDE GULCH 63°52'n 139°18'W
Beron Placers Co. Ltd. 1989, 1990
Water Licence:
YPM89-176
YPM87-012R

This two man operation was located in Eldorado Creek between Oro Grande Gulch and Nugget Gulch in 1989 and moved up into Oro Grande Gulch, a right limit tributary, in 1990.

One Cat D8K bulldozer and one Cat D6 bulldozer were used to dig and push pay gravels. One Cat 950 front end loader was used to feed the wash plant.

The wash plant consisted of a 12 by 4 foot hopper with grizzly classification to 3 inch and then a vibrating deck with 1/4 inch punch plate followed by 3 vibrating sluice runs as follows: One 9 foot sluice for oversize and coarse gold plus two 10 feet sluice runs (4 feet wide each) with expanded metal over nomad matting. This system processed about 130 yards per hour. Discharge water from the wash plant was pumped to a 24 inch diameter hydrocyclone which separated fine gravel and sand from the silty water which was then settled in an out-of-stream pond.

GAY GULCH (ELDORADO CREEK) 115 0 14e
Jim & Marcene Simpson 63°53'N 139°15'W
Water Licence: YPM89-105 1989, 1990

This three person operation was located on Gay Gulch in 1989 and 1990 about 3000 feet upstream from its confluence with Eldorado Creek.

One Case 450 bulldozer was used to dig and push pay gravels, one Komatsu track loader with a one yard bucket fed gravel to the wash plant, and one Huff 2 yard loader was used to stack tailings.

The wash plant had a 1 1/2 inch screened dump and single run sluice 24 inch wide by 40 feet long. Water was fed by 8 inch gravity pipeline.

The stratigraphic section was up to a maximum of 30 feet deep with from 2 to 10 feet of black muck overburden over a gravel layer from 12 to 14 feet deep. Up to six feet of bedrock was processed along with all gravels. Some slumping was present on the left side. Sand layers were found within the gravels.

Approximately 6000 cubic yards total were processed in 1990. Waste water was settled in a series of four instream settling ponds downstream in Gay Gulch.

Gold recovered included fines, coarse flakes and nuggets. The fineness was 790.

BONANZA CREEK 115 0 14e/115 0 14h
Walter Hinneck 63°55'N 139°18'W
Water Licence: YPM88-018

This was a two man operation located on Upper Bonanza Creek below Gauvin Gulch. One Cat D7 bulldozer was used to dig pay from the left limit valley bottom and to remove tailings gravel. A dragline was used to feed the wash plant.

The wash plant was a 4 foot diameter trommel, 58 feet long with a single sluice run 36 inch wide by 22 feet long with expanded metal riffles. A Gorman Rupp 6 by 6 inch pump powered by a G.M. 353 diesel delivered approximately 800 gallons per minute of water which was used to process about 30 cubic yards per hour.

Pay gravel was excavated from the base of the left limit hillside. The depth of the mining cut increased up to about 25 feet of frozen materials. It consisted of about four feet of black muck on top of a mixed layer of muck, gravel, rock and ice over a gravel layer which was up to 5 feet thick on top of the bedrock. All of the gravel plus the mixed layer were processed but none of the bedrock. Total dimensions of the mining cut at the end of the 1990 season were about 200 feet long by 50 feet wide with an average depth of about 12 feet.

A small instream reservoir on Bonanza Creek supplied about 100 gallons per minute of make up water to the out-of-stream recycle pond where all of the mining waste water was settled.

Mr. Hinneck has operated at this site off and on since 1980.

All gold recovered was fine grained powder with an average of 765.

VICTORIA GULCH **115 0 14e**
Vern Trainer **63°54'N 139°13'W**
Water Licence: YPM88-125 **1989, 1990**

This operation was located in the valley bottom between 7 Pup and the mouth of Victoria Gulch. The last full season of operation was 1989. In 1990 the operation finished up and moved onto Bonanza Creek upstream. Two Cat D8 bulldozers and one Fiat Allis loader were used to excavate pay gravel, push up a stockpile and remove tailings. A 1 1/2 yard bucket backhoe was used to feed the wash plant.

The wash plant was a derocker with single sluice run 48 inches wide by 30 feet long lined with both expanded metal and angle iron riffles. One 8 by 10 inch pump powered by a diesel engine was used to recycle water at a rate of approximately 2000 gallons per minute. About 120 yards per hour were processed.

The stratigraphic section on the lower part of the Victoria Gulch valley bottom started with a layer of black muck which averaged about 5 feet in the center and increased up to 30 feet on the sides. Under this was a gravel layer about 5 feet thick on top of bedrock. All of this gravel layer plus about 1 foot of bedrock were sluiced. Waste material was stacked on valley sides. Final dimensions on the cut mined in 1990 were approximately 1000 feet long by 150 feet wide.

Make up water was pumped from an instream reservoir on Bonanza Creek to a recycle pond on Victoria Gulch. Two large instream settling ponds plus the recycle pond were located below the wash plant on Victoria Gulch.

Gold recovered contained a lot of coarse and jagged nuggets with very little quartz attached and about 20% fines. Fineness averaged 820.

BONANZA CREEK **115 0 14f**
Don Coomes **63°53'N 139°08'W**
Water Licence: YPM86-141R **1989, 1990**

This one man operation continued in 1989 and 1990 at the confluence of Upper Bonanza Creek and Ready Bullion Gulch. Pay gravels were excavated from the center and sides of both valley bottoms in Ready Bullion above the confluence and in Bonanza Creek below the confluence. The top layer of frozen black muck averaged about 6 feet deep over a layer of gravel from 4 to 6 feet deep. Depth and composition varied considerably due to many old slides plus ridges in the bedrock.

One Cat D6 and one Allis Chalmers HD21 bulldozer (D8 equivalent) and one Cat 966 front end loader with a 3 1/2 yard, shovel-nose rock bucket were used to strip overburden, dig pay gravel and feed the wash plant. One Gradall G1000 backhoe was used for stripping and for cleaning out settling ponds.

The wash plant consisted of an 8 foot wide by 24 foot long dump box lined with slotted punch plate. Slotts 3 by 1/2 inch were staggered. The 4 foot wide single run sluice was also lined with slotted punch plate for the first 12 feet with another 20 feet of angle iron riffles. Water was supplied by gravity pipeline at a rate estimated to vary between 1000 and 2000 gallons per minute. The processing rate was around 40 to 60 yards per hour. All gravels plus 3 or 4 feet of decomposed bedrock were sluiced.

Waste water was settled in two long, narrow out-of-stream settling ponds. Tailings gravel was used to build a berm between the settling ponds and the creek bypass channel. Waste overburden was stock piled on hillsides.

In 1989 and 1990 one mining cut on Ready Bullion Gulch measured approximately 150 feet long by 75 feet wide to an average depth of 12 feet.

Gold recovered contained rough, angular nuggets and coarse gold with very little quartz. The fineness ranged between 820 and 850.

BONANZA CREEK 115 0 14e & 115 0 14h
Erich Raguth 63°55'N 139°18'W
Water Licence: YPM86-103

This two man operation on Upper Bonanza Creek, a few claims upstream from Grand Forks, was subcontracted to Carson Gold in 1989 and 1990. One Cat D9 and one backhoe were used to dig pay gravels. One Cat 966C front end loader with a 4 1/2 yard bucket was used to feed the wash plant and remove tailings. The wash plant was a derocker with single sluice run five feet wide by 20 feet long. An 8 by 10 inch pump powered by a Cat 3208 diesel delivered from 1500 to 1800 gallons per minute. From 40 to 50 cubic yards per hour were processed. The mining cut averaged about 15 feet deep near the middle of the valley bottom and consisted of an upper layer 10 to 12 feet deep of mixed dirt and rock over a bottom layer of gravel that averaged 5 feet deep on top of bedrock. All gravel plus about two feet of bedrock were processed. The cut sizes averaged about 75 feet by 50 feet in 1989.

In 1990 about 600 cubic yards were sluiced in May and June but gold recovery was not appreciable so the operation shut down in June. Tailings piles were flattened in the valley bottom and a stable creek channel was restored.

Water was recycled 100% in out-of-stream settling ponds. Gold recovered was all fine grained with no nuggets. The fineness averaged 800.

DISCOVERY PUP 115 0 14g
LAST CHANCE CREEK 64°00'N 139°07'W
Peter I. Erickson 1989, 1990
Water Licence: YPM89-110

This property is located on Discovery Pup, a left limit tributary of Last Chance Creek which flows into Hunker Creek.

The stratigraphic section consists of a thin organic layer covering a layer of frozen black muck ranging from as little as 10 feet to as much as 20 feet thick. Masses of sticks and trees are found throughout the black muck which complicated both the stripping and sluicing operations. Virtually no gravels are found beneath the black muck. A few stream rounded quartz boulders were found but normally only fractured bedrock is found under the black muck. Between 2 and 4 feet of broken bedrock is sluiced along with any gravel that is found. The gold is found in the broken bedrock which is believed to be a secondary deposit on top of the original valley floor. Old bones and horns are found throughout the cut. Old timers shafts were found in several locations in the cut. Two cuts, for an approximate total of 10,000 bedrock square feet, were sluiced in 1989. The same cut was enlarged towards the right limit in 1990. Again two cuts, for a total of 8,000 bedrock square feet, were sluiced in 1990. Depth of cut could not be determined thus bedrock square feet has been used.

Pete Erickson and his wife ran this operation. Whenever water is not a limiting factor a regular shift is worked. In 1989 a mid summer dry spell resulted in short work days. More rain in 1990 and fewer upstream operators relieved the water shortage and sluicing occurred over longer periods.

Heavy equipment consisted of a Cat D7 bulldozer, a Cat D6 bulldozer and a Cat D4 bulldozer. The D7 bulldozer does the dozer work such as moving the tailings and pay out of the cut. The D6 bulldozer was the main piece of equipment and was used to feed the sluice box and clear tailings. The D4 bulldozer was around for doing chores only. A hoe was brought in when needed to muck out the out-of-stream settling facilities.

This photo shows Pete & Marg Erickson's mining operation on Discovery Pup on Last Chance Creek.

The sluice box consists of a dump box attached to a conventional single sluice run. The dump box measures 7 feet wide by 20 feet long and is lined with coco matting and punch plate of various sizes. The sluice run measures 30 inches wide by 25 feet long. Coco matting with 2 inch angle iron riffles and 1/2 inch punch plate lines the sluice run. Approximately 35 to 40 cubic yards per hour can be sluiced using an estimated 1000 - 1200 igpm of water. Water was pumped from an instream pump pond on Last Chance Creek to the cut on Discovery Pup for hydraulic monitoring and for sluicing. The effluent was settled in an instream settling pond on Last Chance Creek in 1989. Out-of-stream settling facilities were constructed at the mouth of Discovery Pup for 1990. A recycle system was used in 1990 where the outflow from the settling facilities was above the instream pump pond on Last Chance Creek. An 8 by 8 inch pump and an 8 by 6 inch pump are coupled to pump the water up Discovery Pup for monitoring and sluicing.

The gold was reported to be primarily fine grained and well worn indicating the gold likely had travelled some distance. Some quartz shows up in the gold but is not common. The fineness of gold is 700.

15 PUP **115 0 14g**
(LAST CHANCE CREEK) **63°55'N 139°09'W**
Mike Olynyk **1990**
Water Licence: YPM89-109

Mining took place at this location in 1990 by Bruce Cowan, who is a New Zealand placer miner new to the Klondike. Mining under Mike Olynyk's water use licence, the operation began near the mouth of 15 Pup and worked upstream.

The stratigraphic section has been influenced by earlier hydraulic mining on Treasure Hill, a bench above the left limit of 15 Pup. Up to 20 feet of hydraulic tailings had been deposited on top of the left limit of 15 Pup. These tailings needed to be stripped off but because of their presence the ground beneath was thawed and stripping was considerably easier than normal. Approximately 23 feet of black muck and ice lenses were found beneath the hydraulic tailings. The valley walls are steep so depths are an average since the limits tend to have a deeper stratigraphic section than the centre of the valley. An average of 4 feet of pay gravel sits on a decomposed schist bedrock. The depth of gravel varies from 3 feet deep on the left limit to 10 feet deep on the right limit. The sluice section consisted of all the gravels and up to 2 feet of bedrock. Most of this ground had been heavily worked by old timers in underground operations. Evidence of old timers was found throughout the 1990 cut. The best pay was found in any pillars left in the drifts and in the first 2 feet of bedrock which the old timers had to leave or could not mine. A single cut measuring 225 feet long by 90 feet wide was stripped and sluiced. Most of 1990 was committed to shipping the heavy equipment and sluice plant to the Klondike from New Zealand and setting up. In addition a drain needed to be dug to the mouth of 15 Pup to drain the first cut. Several weeks were also used to set-up and sluice stockpiled pay gravels on Treasure Hill.

This operation was run by Bruce Cowan primarily although the stripping was partially done by a paid operator.

Heavy equipment consisted of a Komatsu 155A bulldozer and a Hitachi UH143 hoe. The bulldozer and the hoe were both used for stripping and digging the drain. The sluice plant was fed using the hoe and tailings were cleared off using the bulldozer.

Feeding the wash plant at Newcan Mining, Treasure Hill.

The sluice plant consisted of a hopper feeding a trommel 5 feet in diameter by 20 feet long with 1/2 inch punch plate. The classified pay is then spread out over a series of sluice runs 12 feet wide by 8 feet long. The center section of sluice utilizes hydraulic riffles near the top and flat bar riffles in the lower section. A side run on each side has expanded metal only. No matting was used in the sluice runs although the operator intends to use matting in 1991. A boil box above the sluice runs was found to capture a high percentage of the gold. Tailings were carried off by a conveyor stacker which could be pivoted in order to increase the sluicing time before the tailings needed to be pushed away. The trommel, the stacker and the hydraulic levelling pads were driven by a 4 cyclinder Ford diesel engine. The entire sluice plant was built on one frame so that it can be easily skidded to a new location. The processing rate of the sluice plant was estimated by the operator at 80 cubic yards per hour using approximately 600 igpm water. Water was pumped from an instream pump pond on Last Chance Creek by a 5 by 4 inch Ajax pump powered by an Isusu 150 HP motor. A large instream settling pond has been built out of the 1988 T.P. Resources Ltd. cut on Last Chance Creek.

The gold recovered tended to be angular and rough. Quartz was common in much of the gold. Some crystalline and dendritic gold was recovered. Although no gold had been sold the fineness was believed to be about 700.

INDEPENDENCE CREEK **115 0 14g**
Keldon C. Adams and **63°59'N 139°01'W**
Judith C. Adams **1990**
Water Licence: YPM90-035

This is a very small scale operation near the mouth of Independence Creek, a left limit tributary of Hunker Creek. Keldon Adams was at this site for only a short period of time in the early spring of 1990.

An exploratory cut into the right limit hillside of Independence Creek has been dug over the last five years. Bedrock has not been reached yet and little information on the stratigraphic section has been obtained. No pay gravels have been sluiced from the cut yet. Keldon Adams and a relative worked here in 1990.

A #6 Traxcavator was the only equipment at the site so a leased hoe did most of the stripping before frozen ground stopped any further progress. Thawing with water points was attempted but no further stripping has been done since 1989.

No sluicing has been done but gold panned from the cut is either flat and smooth or granular. No information on fineness was given.

HESTER CREEK **115 0 14g**
Emile Levesque **63°59'N 139°03'W**
Water Licence: YPM90-005 **1990**

Mining for most of the 1990 season was done under Wolverine Gold Mines Ltd. water use licence number YPM88-003 until September when Mr. Levesque obtained his own licence. This operation mined at the mouth of Hester Creek, a left limit tributary of Hunker Creek, throughout the 1990 season. This was the first year at the site.

Emile Levesque is mining side pay on Hester Creek which Wolverine Gold Mines Ltd. left in 1988 and 1989. The stratigraphic section consists of up to 75 feet of thawed ground. Old timer's tailings washed off the hillside above the left limit of Hester Creek covered the creek and has thawed the ground to bedrock. Approximately 6 feet of old timer's White Channel tailings cover 25 feet of black muck. Between 10 and 20 feet of gravel sits on either a decomposed or fractured consolidated bedrock. The entire gravel strata and 1 1/2 feet of the fractured bedrock was sluiced. Gold was not found to have penetrated the decomposed bedrock. There were no systematic cuts sluiced. Emile Levesque would either monitor or sluice continuously. An area 300 by 300 feet by a depth of 60 feet to as much as 120 feet was stripped and sluiced in 1990.

Emile Levesque ran this operation between 16 and 18 hours each day by himself. Emile Levesque's wife assisted during clean-ups.

A Cat 950 loader was used to carry pay from the cut and feed the sluice box as well as carrying tailings away. A John Deere 450 bulldozer with backhoe dug ditches where needed but tended to be used very little.

A new sluice plant was used for the 1990 season. A 5 foot wide by 12 foot long shaker was used to classify the pay. Screen (1 1/4 by 3 inch) lined the shaker. The classified pay was fed into two sluice runs 24 feet long. The first 4 feet of each run was lined with nomad matting and expanded metal. The next 12 feet was lined with nomad matting and 1 1/2 inch angle iron riffles. The last 8 feet was lined with nomad matting and expanded metal. An estimated 120 cubic yards per hour can be sluiced with 1300 igpm of water. A 10 KW power plant runs the shaker plant and light system for night sluicing. Water for sluicing is pumped from out-of-stream cuts mined by Wolverine Gold Mines Ltd. at the mouth of Hester Creek. The cuts have since filled with water. When not sluicing, water from Hester Creek is diverted into the cuts. While sluicing the effluent bypasses the pumping ponds and flows downstream to two large out-of-stream settling ponds built on ground owned by Tamarack. Effluent outflow is by seepage only.

The gold was reported to be almost entirely fine grained with some coarse gold. The gold is flat and smooth with lots of quartz attached. The fineness is 720.

HESTER CREEK 115 0 14g
Klondike Reef Mines 63°59'N 139°03'W
(Wolverine Gold Mines Ltd.) 1989
Water Licence: YPM88-003

This mine was located at the mouth of Hester Creek, a left limit tributary of Hunker Creek. The operation worked throughout the 1988 and 1989 season but did not return in 1990.

Most of the mining in 1988 was done at the mouth of Hester Creek and continued upstream. Some mining on Hester Creek was done in 1989 but the bulk of the 1989 season was spent mining a series of cuts in the Hunker Valley up against the left limit hillside. The stratigraphic profile has been altered by hydraulic mining on Nugget Hill. Up to 20 feet of White Channel gravels have been washed down off Nugget Hill. These tailings have tended to thaw much of the ground which otherwise would have been frozen. Beneath the hydraulic tailings a layer of black muck 10 feet thick was encountered. A thin 2 foot layer of gravel and then another layer of black muck 2 feet thick occurred. The pay gravels averaged 6 to 8 feet thick and overlie fractured bedrock. All of the lower layer of gravel and 1 foot of the fractured bedrock was sluiced. One large cut 100 feet wide by 1500 feet long was mined in 1989. The cut began at the mouth of Hester and worked upstream along the left limit of Hunker Creek towards Independence Creek. A crew of nine employees and a camp cook ran this mine during the 1989 season on a double shift.

Two Cat D9 bulldozers were used for stripping the cuts. A Cat 992 loader was also used to strip the cuts since they were in thawed ground. A Cat 235 hoe assisted the stripping program up against the vertical face on the left limit. A Hitachi UH20 hoe loaded the pay gravels into two 75 ton Haul Pak trucks which moved the pay out of the cut to the sluice plant. A Cat 966 loader fed the sluice plant and cleared tailings.

The sluice plant consisted of a derocker feeding a single sluice run 4 feet wide by 20 feet long. The first 8 feet of the run is lined with astro turf, angle iron riffles and punch plate. The lower 12 feet is lined with astro turf and angle iron riffles only. An estimated 100 cubic yards per hour can be sluiced with between 700 - 1000 igpm of water. Due to the unusually dry conditions in 1989 various systems were needed ranging from full recirculation to no recirculation.

The gold recovered tends to be fine grained and flat. Fineness is 850.

HUNKER CREEK 115 0 14g/116 B 3a
Tamarack Inc. 64°00'N 139°05'W
Water Licence: YPM89-003 1989, 1990

This operation is located on Paradise Hill, a left limit bench of Hunker Creek between 80 Pup and Hester Creeks.

The ground mined is White Channel gravel. Reefs and domes in the bedrock provide for considerable variations in the depth of the stratigraphic section. On average the depth to bedrock is 85 feet but that can increase to as much as 145 feet in areas. The 1989 cuts showed three separate layers. A 5 foot layer of overburden covered 5 to 40 feet of red gravels. Between 40 and 85 feet of White Channel gravels were found beneath the red gravels. Bedrock was of a decomposed schist type. The 1990 cut showed a thin organic layer covering approximately 50 feet of Klondike wash gravels and between 35 and 60 feet of white channel gravel. Again the bedrock was decomposed. About 35 to 40 feet of the lower White Channel gravel and no bedrock was sluiced in 1989 and most of 1990. Only the bottom 15 feet of White Channel gravel was sluiced on the last rim cut in 1990. A single cut measuring 500 feet wide by 900 feet long for a total of 600,000 - 700,000 cubic yards was mined in 1989. A similar cut plus a rim cut were mined in 1990.

Mr. Frank Short, property manager, and twelve employees worked this property on a double shift basis. Eight of the employees worked on the sluicing and three employees worked on the drilling program. In addition Tamarack has a cook in camp.

A D9L bulldozer feeding the sluicing plant at Tamarack Inc's operation on Paradise Hill, Hunker Creek.

A Cat D10 bulldozer, two Cat D9 bulldozers, a Cat D7 bulldozer two 966C Cat loaders, an International 560 pay loader, a Bantam 1 1/2 yard bucket dragline, a mobile auger drill and a churn drill were used to mine this property. The D10 bulldozer stripped the cuts while the D9 bulldozers were used for sluicing. The D7 bulldozer pulled the drills and helped wherever needed. The 966C loaders were used for part of 1989 to feed the sluice plant and carry tailings away. The 560 loader was also used for tailings in 1989. In 1990 the box was fed with the D9 bulldozer and a 966C loader carried tailings away. Some of the equipment proved to be surplus to the operational needs. The two drills were used to prove out ground before mining. The pay streak is relatively narrow and deep and to remain economical must be mapped extensively before stripping.

The sluice plant consists of an 80 yard apron feeder which drops the pay gravels onto a variable speed conveyor. The conveyor feeds an 8 foot diameter by 60 foot long trommel (scrubber). A manifold washes the gravels along the length of the scrubber with a 6 foot section of punch plate at the lower end which classifies the pay to - 3/4 inch for the sluice runs. The - 3/4 inch pay is collected and spread out over six 3 foot wide by 20 foot long suspended oscillating sluice runs. The sluice runs are lined with nomad matting and expanded metal. In 1989 and part of 1990 a 4 foot wide by 250 foot long tail race carried the washed tailings and effluent from the sluice run to the Hunker valley run. Between 180 and 225 cubic yards per hour were sluiced with an estimated 2500 igpm of water. Water was lifted 400 feet from an instream pump pond on Hunker Creek to the wash plant by a 8 by 10 inch high pressure Demming pump powered by a D398 Cat diesel engine. The effluent was settled in three large out-of-stream settling ponds beside Hunker Creek upstream of the pumping pond. A 6 cylinder Deutz engine hooked to a gear box powers the scrubber. A John Deere 185 KW power plant runs the light system, the conveyor belt and the eccentric flywheel on the oscillating sluice runs. The system worked similar to a giant recirculation system, after time allowed to settle the water it was returned to Hunker Creek

The gold was reported to be primarily fine grained and flat although granular gold was recovered. A fair bit of quartz is found attached. Both crystaline and dendritic gold is found in small amounts. The fineness is between 830 and 850.

HOMESTAKE GULCH **115 0 14h**
Alf & Marlene Roberts **63°56'N 139°15'W**
Water Licence: YPM89-073 **1989, 1990**

This family operation continued in 1989 and 1990 on Homestake Gulch, about one mile upstream from its confluence with the right limit of Upper Bonanza Creek. Homestake Gulch is narrow and steep sided in the area being mined. A Bucyrus Erie dragline was used to strip overburden and to clean out the recycle ponds and an International 125C track loader was used to dig pay, feed the wash plant and remove tailings. The wash plant had a 3 by 6 foot shaker screen to minus 3/4 inch with a single sluice run 18 inches wide by 20 feet long with 4 feet of expanded metal and 16 feet standard angle iron riffles. A 4 by 4 inch trash pump powered by a 16 horsepower Briggs & Stratton gasoline engine was used to recycle about 400 gallons per minute. About 10 to 12 yards per hour were processed.

The mining cut was in the center of the narrow valley bottom and varied in depth from 18 feet up to 30 feet. The bottom layer of gravel was from one to four feet deep under a layer of mixed rock, dirt clay and ice that varied from 12 feet up to 20 feet under a layer of organic soil up to 4 feet deep. Mammoth tusks and bones were found in the middle layer. The bottom gravel layer plus up to 2 feet of bedrock were sluiced. As mining progressed upstream the width of the cut became narrower. The 1989 cut was about 200 feet long by 20 feet wide. The 1990 cut was about 200 feet long by 15 feet wide. Waste materials were stockpiled by dragline on the right hand side. Waste water was settled and recycled from two instream ponds immediately below the wash plant and was further settled in a third instream pond about 1500 feet downstream in Homestake Gulch.

Gold recovered is mostly fine grained with some small, coarse flakes. The amount of quartz attached seems to increase as mining progresses upstream. The fineness was 660.

HOMESTAKE GULCH **115 0 14h**
Jim Conklin **63°55'N 139°15'W**
Water Licence: YPM88-116

This two man operation was located on the bottom 1/2 mile of Homestake Gulch, a right limit tributary to Upper Bonanza Creek. A Komatsu 355 bulldozer and a Cat D8 bulldozer were used for stripping and stockpiling pay gravel. A Case W26B loader was used to remove and stack tailings and an Ensley one yard bucket backhoe was used to feed pay gravels into the wash plant. The wash plant had a 4 by 6 feet one deck shaker screen and a single sluice run 4 feet wide by 16 feet long with standard riffles followed by expanded metal. A 6 inch pump powered a 4 cylinder Ford

Industrial engine delivered from 500 to 600 gallons per minute which was used to process up to 30 cubic yards per hour through the sluice.

The mining cut was up to 45 feet deep consisting of a black muck layer up to 37 feet thick on top of a gravel layer that was up to 8 feet thick sitting on bedrock. All gravels plus 2 feet of bedrock from a cut approximately 400 feet long by 50 feet wide were sluiced.

Water was recirculated from two instream settling ponds on Homestake Gulch.

Gold recovered was all fines (16 to 18 mesh) with an average fineness of 750.

BONANZA CREEK **115 0 14i**
Vince Amendola **63°59'N 139°22'W**
Water Licence: YPM89-106 **1990**

This was a new operation in 1990. It is located on the left limit bench of Bonanza Creek between Sourdough Gulch and 49 Gulch. One John Deere 25 bulldozer was used to strip 2 to 3 feet of overburden and stockpile 3 to 4 feet of pay gravels on top of the left limit bench.

No sluicing was accomplished in 1990 due to problems encountered in trying to pump water from Bonanza Creek uphill onto the bench.

BONANZA CREEK **115 0 14i**
K.M.A. Mines (Gene Fowler) **63°58'N 139°21'W**
Water Licence: YPM87-104 **1989**

This operation has been located in the Bonanza Creek valley bottom near Forty-Nine Gulch for several years but 1989 was the last year of operation. Two Cat D9 bulldozers were used to dig pay gravels and push up a stockpile. One 2 1/2 yard bucket backhoe was used to feed the wash plant and one Cat D9 bulldozer was used to remove and stock tailings gravels.

From 5 to 7 miners were employed.

The wash plant was a 6 by 16 feet three deck shaker which classified down to 3/8 inch followed by double sluice runs 4 feet wide by 20 feet long each using expanded metal riffles.

The deposit in the valley bottom near the mouth of Forty-nine Gulch was approximately 50 feet deep with 40 feet of mixed black muck and gravel over the pay gravel layer which was about 5 feet deep. All gravel plus up to 5 feet of decomposed bedrock were sluiced. Two cuts were mined in 1989 approximately 200 feet wide by 500 feet long each.

Water was pumped from an instream reservoir in Bonanza Creek using a 6 by 6 inch pump powered by an 8 cylinder Deutz diesel. Approximately 1200 gallons were used to process up to 150 cubic yards per hour. Waste water was settled in a series of out-of-stream settling ponds prior to discharge back into Bonanza Creek.

Gold recovered was a mixture of both flattened and chunky flakes and nuggets. The fineness averaged between 690 and 720.

BONANZA CREEK **115 0 14i**
Ralph Troberg **63°58'N 139°21'W**
Water Licence: **1989, 1990**
YPM87-021R
YPM89-140

This two man operation was located on Bonanza Creek below Boulder Creek. For several years prior to 1989 the operation was located on top of the right limit bench. In 1989 and 1990 the operation relocated in the valley bottom on the left side and on the left limit bench.

One Cat D9H and a Cat D8H bulldozer were used for ripping and pushing pay gravel and tailings. A 5D 844 front end loader was used to feed the wash plant and a 644 loader was used as backup and for cleaning trenches.

The wash plant was a 12 by 18 feet dump box and single sluice 32 inches wide by 22 inches long with expanded metal over nomad matting for the first 10 feet and then standard 2 inch angle iron riffles over coco matting. A 6 by 8 inch pump powered by a Ford diesel delivered up to 1500 gallons per minute of water which was used to process from 60 to 80 yards per hour.

The valley bottom mining cuts were in a stratigraphic section with black muck overburden averaging 15 feet deep and up to 30 feet deep. The orangy brown gravel layer was from 6 to 8 feet deep. All gravel plus about one foot of decomposed bedrock was sluiced. The bench cut was in old timers workings in a gravel layer which averaged 12 to 15 feet near the run and got deeper into the hillside. Some old trenches were cleaned out and sluiced. Waste overburden was pushed mechanically and stockpiled.

Two cuts in the valley bottom were completed in 1990 approximately 75 by 150 feet and 60 by 80 feet. Water was recycled 100% from two large out-of-stream settling ponds with seepage discharge only back to Bonanza Creek.

Gold recovered in the valley bottom was all fine powder and bench gold was coarser.

BONANZA CREEK	**115 0 14i**
King Solomon Mines	**63°57'N 139°21'W**
Water Licence:	**1989, 1990**
YPM89-041	
YPM90-024	

This was a two man operation which moved to several different locations on Bonanza Creek between Boulder Creek and Adams Gulch. In 1989 some work was done in the valley bottom of Bonanza Creek near Monte Cristo Hill and on the first tier left limit bench near Boulder Hill. In 1990 the bench rim deposits at Fox Gulch and American Gulch were worked along with some second tier, high level deposits on the left limit of Bonanza between Magnet Gulch and American Gulch. These second tier deposits varied from 75 feet up to 120 feet deep.

Two Cat D8 bulldozers were used for stripping and pushing pay gravel. Three Cat loaders (980C, 980D, and 966) were used to feed the wash plant and remove tailings. The wash plant was a single sluice and dump box with standard angle iron riffles 32 inches wide by 25 feet long. Up to about 50 yards per hour were processed.

Water from Bonanza Creek was pumped up onto the bench using a 10 by 12 inch pump. Water from recycle ponds on the bench was pumped to the sluice using a 5 by 5 inch Rupp pump. Waste water was contained in out-of-stream settling ponds on the bench.

Gold varied from location to location but was mostly fine grained with the fineness ranging between 750 and 800.

BONANZA CREEK	**115 0 14i**
Ivan Daunt	**63°55'N 139°20'W**
Water Licence: YPM88-094	**1989, 1990**

This operation is located near the mouth of Skookum Gulch, a left limit tributary to Bonanza Creek immediately below Grand Forks.

This was a two man operation run by Ivan Daunt and his son Kieran.

An Allis Chalmers HD16 bulldozer (D7 equivalent) was used to excavate pay gravels in Skookum Gulch. A 3 1/2 yard bucket front end loader and a one yard track loader were used to carry gravel to the wash plant and remove tailings. The wash plant was a 5 by 12 feet dump box with a 20 feet single (sluice) run with standard angle iron riffles. A 6 by 6 inch pump powered by a Perkins 6 cylinder diesel engine delivered approximately 1200 gallons per minute which was used to process about 30 cubic yards per hour.

As the source of pay gravel has progressed upstream in Skookum Gulch, the depth of black muck overburden has increased. In 1990 at about four claims up the Gulch the depth of overburden was about 20 feet with a gravel layer of 3 to 6 feet on top of broken bedrock. All gravel plus up to 3 feet of ripped bedrock were processed. Approximate dimensions of pay cuts for 1989 and 1990 were both about 300 feet by 20 feet.

Water was pumped from an instream reservoir on Bonanza Creek and was settled in two out-of-stream ponds on Skookum Gulch.

Gold was mostly coarse flakes and nuggets with few fines below 40 mesh and the fineness averaged between 650 and 750.

FRIDAY GULCH	**115 0 15**
(SULPHUR CREEK)	**63°46'N 138°54'W**
Neil Cross	**1989, 1990**
Water Licence: YPM89-071	

This property was located on Friday Gulch, a left limit tributary of Sulphur Creek. A cut was mined in 1989 although one partner returned no mining was done in 1990.

The stratigraphic section is made up of a shallow organic layer overlying 25 feet of frozen black muck. Several unbroken mammoth tusks and numerous bones were found in the muck. A 5 foot layer of gravel sits on a bedrock which varies between fractured slabs and fully decomposed. The entire gravel layer and usually 2 feet of bedrock are sluiced. A 150 by 150 foot cut was stripped and about one half of the gravels were sluiced in 1989. Another 5000 cubic yards of old tailings were also sluiced.

The mine was run by Bernie Walter and Dietmar Gritzka. A single irregular shift was run in 1989.

A Cat D8H bulldozer was used to strip and feed the sluice box. A Komatsu D65E bulldozer also stripped and cleared tailings. The wash plant consisted of a dump box which fed into a single run. The single run then splits into three runs. The center run measures 3 feet wide by 30 feet long. Coco matting and angle iron riffles line the run with 5/8 inch punch plate in the section which diverts the pay into the side runs. The side runs are 2 feet wide by 8 feet long. Coco matting and expanded metal lines both side runs. Production for this box was estimated to be 70 cubic yards per hour. An 8 inch Waukesha pump supplied water from an instream pump pond on Friday Gulch to the sluice box. The effluent was settled initially in an out-of-stream settling pond with final settling occurring in the downstream Sulphur Creek Community Settling Pond structure.

The gold was fine grained and porous. Quartz was attached to much of the gold and the fineness was between 790 and 804.

Dietmar Gritzka holding an 11 foot Mammoth tusk recovered from Neil Cross's operation on Friday Gulch, a tributary of Sulphur Creek.

HUNKER CREEK **115 0 15**
Daval Mining **63°59'N 138°58'W**
Water Licence: YPM89-037 **1989, 1990**

This property is located at Claim 40 Below Discovery on Hunker Creek between the left limit tributaries Colorado Creek and Not Much Gold Creek.

The area mined in 1989 and 1990 was previously dredged in 1919. The profile has been well mixed and shows no distinct strata. In general 8 or 9 feet of gravel was stacked on top of 10 feet of black muck/gravel. The ground would have averaged 30 feet deep but material from earlier years of stripping were placed on the 1989 and 1990 cuts and had to be moved again. Only the lower 10 - 15 feet above bedrock was frozen. The bedrock varied between clay and fractured consolidated. The sluice section consists of the top 3 feet of bedrock where possible and any gravels which the dredge left on bedrock. A single cut 120 feet wide by 500 feet long was stripped and partially sluiced in 1989. The 1989 cut was finished in 1990 along with a cut measuring 80 feet wide by 140 feet long. A second cut 60 feet wide by 100 feet long was expected to be stripped and possibly mined in 1990. As in past years the operation was run by Allan and Dave Gould working a single shift 7 days/week.

A Cat 950 loader and a Cat D3 bulldozer were used along with a Komatsu PC220 hoe which was added in [illegible]9 to mine this ground. The loader and hoe were used to strip the ground and feed the sluice plant. The D3 dozer scraped the bedrock and handled odd jobs such as moving pumps.

This PC220 Kamatsu hoe was engaged in stripping and removing pay gravels at Daval mining operation on Hunker Creek.

The sluice plant consists of a 12 foot wide by 14 foot long shaker screen feeding a single sluice run. The shaker was lined with 3/4 inch punch plate. An extra section of sluice run was added to the sluice plant in 1990 as it was believed some gold was being lost. Between 30 and 50 cubic yards per hour was sluiced while using between 900 and 1200 igpm of water. The old cut is used as an out-of-stream recirculation system. Water is pumped to the sluice plant by a 6 inch Gorman-Rupp pump and the effluent is returned to the pump pond.

Most of the gold recovered is between 14 and 20 mesh. The gold tends to be flattened with very little quartz. Fineness is 820.

HUNKER CREEK 115 0 15
Harold W. Shannon 63°58'N 138°59'W
Water Licence: YPM88-101 1989, 1990

Harold Shannon, Ron Carothers and another part time miner/partner are mining on a small scale near the left limit of Hunker Creek immediately downstream of Not Much Gold Creek.

The area being mined has been dredged and the profile has been altered completely. The ground is frozen and averages 15 feet to bedrock. An 8 foot layer of coarse tailings overlie 6 to 8 feet of dredge slickings. The dredge missed some of the gravel immediately above bedrock in some areas and this proved to be the best pay. Since the ground has been mixed up, the entire profile is sluiced to bedrock. Bedrock is consolidated and was not sluiced. A single cut 150 feet wide by 150 feet long was sluiced in 1989 to a depth of 10 feet, which was short of bedrock. A single irregular shaped cut 2700 bedrock square feet was sluiced in 1990. Depth of cut could not be determined.

A Cat D8H bulldozer was used to strip the cuts and stockpile pay next to the sluice plant. A 2 1/2 yard Northwest dragline fed the sluice plant while a Cat 950 loader hauled tailings away.

The sluice plant consisted of a derocker feeding a 4 foot wide by 28 foot long single sluice run. The sluice run was lined with nomad matting, expanded metal and angle iron riffles. Production was estimated at 45 cubic yards per hour. An 8 by 6 inch Japanese made pump or a 6 by 6 inch Monarch pump supplied water for sluicing. Water was pumped from an out-of-stream pond to the sluice plant. Effluent treatment was provided in an out-of-stream settling pond.

The gold recovered in 1990 was angular and rough. Approximately 25% was + 6 mesh. Fineness was 817.

DOMINION CREEK 115 0 15a
Favron Enterprises Ltd. 63°48'N 138°38'W
Water Licence: YPM89-016 1989, 1990

This seven person operation was located on Dominion Creek between Caribou and Chapman Pup. Two Terex bulldozers were used to dig and push gravel and to feed the wash plant. An American 35 backhoe/excavator was used to dig drains and one Case front end loader was used to remove and stack tailings. The wash plant consisted of a hopper with conveyor belt feeding to a derocker with spray bars and six sluice runs. A 10 by 12 inch pump, powered by a GM 671 diesel engine, provided approximately 2000 gallons per minute which was used to process about 100 cubic yards per hour.

The stratigraphic section near the middle of the wide valley section had 20 to 25 feet of frozen black muck over a sandy gravel layer that averaged 3 to 4 feet deep on top of decomposed bedrock. All gravel plus 1 foot of bedrock were processed through the wash plant. Water was recycled from large instream settling ponds.

Gold recovered was flat with up to 1/4 inch nuggets and fineness was 820.

DOMINION CREEK 115 0 15a
Art Sailor 63°48'N 138°37'W
Water Licence: 1990
YPM88-095
YPM89-088

This operation is located on Dominion Creek. The deposit was frozen to bedrock and approximately 40 feet deep and consisted of 30 to 35 feet of black muck overlying 5 to 8 feet of pay gravels.

Mr. Sailor and five other persons worked the property on a single shift basis in 1990.

Heavy equipment on the property included two Cat D8 bulldozers and one Cat D9H bulldozer, used primarily to strip overburden and stockpiling. Two Cat 980 loaders were used to feed the wash plant and remove tailings, with one Cat E300 and one Cat 225 excavators used for general duties.

A derocker wash plant with five 4 by 20 foot sluice runs was used to process 100 cubic yards per hour. Sluice water was supplied by a 10 by 12 Byron Jackson pump powered by a Cat diesel engine.

The gold was fine grained with a fineness of 820.

DOMINION CREEK 115 0 15b
J. Taylor 63°49'N 138°40'W
Water Licence: YPM89-184 1990

This property was worked by two miners on a single shift using a Cat D8 bulldozer for stripping and an International 14A bulldozer for tailings removal. Twelve cubic yard International dump truck with a John Deere 450 and Bobcat 720 as general duty and stand-by machine.

The deposit consisted of 8 to 10 feet of black muck and four feet of fine gravel over six feet of washed gravel. The lower three feet of gravel plus two feet of bedrock were sluiced.

The wash plant consisted of a 20 foot single run sluice box with expanded metal over nomad matting. The plant processed 30 yards of pay gravel per hour using 1000 igpm.

The fineness of the gold recovered was reported to be between 820 and 840.

SULPHUR CREEK **115 0 15c**
Sulphur Gold Placers **63°47'N 138°54'W**
Water Licence: YPM89-010 **1989, 1990**

This property is located on Sulphur Creek approximately 2000 feet upstream from Friday Gulch. Sulphur Creek is a relatively wide valley and mining activity was carried out on the right limit.

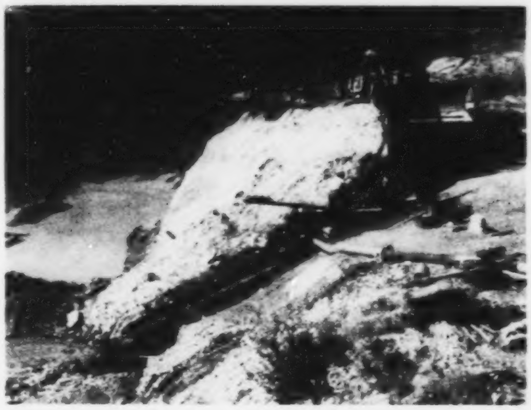
The stratigraphic section consists typically of 26 feet of frozen black muck and occasional silt layers. Three to four feet of gravel is found on top of bedrock which tends to be of a decomposed type. Two cuts were mined in 1990. The first measured 300 feet long by 150 feet wide. The second cut measured 200 feet long by 100 feet wide. The lower 2 feet of gravel and top 2 feet of pasty clay bedrock are sluiced.

This operation was run by Bud Pierson and his two sons Mark and Paul on a single shift between 7:30 a.m. and 6:00 p.m.

Heavy equipment used consists of a Cat D8K bulldozer and a Cat D7 bulldozer. The D8K was used for stripping, feeding the sluice box and clearing tailings. The D7 was used for stripping and other assorted duties.

The sluice box consisted of a side feed dump box measuring 6 1/2 by 24 feet leading into a single run 32 inches wide by 26 feet long. The processing rate is believed to vary between 80 and 120 cubic yards per hour. An 8 by 10 inch Morris pump powered by a 3208 Cat engine delivers the 2000 igpm needed for sluicing and any hydraulic stripping that is done. Water is pumped from an instream pump pond. Primary settling occurs in a private downstream settling pond with final settling in the Sulphur Creek Community Settling Pond.

Gold recovered is primarily fine grained. The screeened sizes work out approximately as 10% + 10 mesh, 60% - 10 + 40 and 30% - 40. A combination of two distinct types of gold apperared to show up. A flat and solid type or rounded jagged gold with quartz was recovered. The gold fineness was reported at 799.



This photo shows a D8K bulldozer owned by Sulphur Gold Placers, feeding a single run sluice box with the cut in the background.

SULPHUR CREEK **115 0 15c**
Murray Crockett **63°48'N 138°56'W**
Water Licence: YPM86-114RL **1989**

This three person operation is located near the headwaters of Sulphur Creek. Side pay along the left limit was mined in 1989. The cuts were finished in 1990 and the operation shut down at this location.

The stratigraphic section consisted of 10 feet of frozen gravel and overburden. The lower 4 feet of gravel are sluiced. Three cuts (150 by 300 feet, 150 by 250 feet, 150 by 200 feet) were mined on a left limit bench in 1989. A Cat D9G bulldozer and a Cat D8 bulldozer were used to strip the ground, stockpile the pay and clear tailings. A Cat hoe fed the sluice plant which consisted of a dump box leading into three sluice runs. The processing rate, estimated by the operator was 100 to 150 cubic yards per hour. Water was pumped to the wash plant from an instream recirculation pond. Effluent outflow was further settled in the Sulphur Creek Community Settling Pond located downstream.

Gold in the bench cuts has been very fine grained. Fineness is 810.

SULPHUR CREEK 115 0 15c
Meadow Gold Placers 63°50'N 138°51'W
Water Licence: YPM88-050 1990

Two miners working a single shift mined this property using a Komatsu 355 bulldozer, a Cat D8K bulldozer and a Cat 235 excavator.

The wash plant consisted of a triple run sluice box with the centre run having punch plate over hungarian riffles and side runs with expanded metal over coco matting. Pay gravels were processed at a rate of 130 cubic yards per hour using water at a rate of 3500 igpm.

The deposit consisted of 43 feet of black muck over 4 feet of gravel. All gravel plus four feet of decomposed schist bedrock were sluiced.

Gold recovered was fine grained to granular with a fineness of 800.

GOLD BOTTOM CREEK 115 0 15d
C. Wienert 63°57'N 138°58'W
Water Licence: YPM86-121 1990

Two miners working a ten hour shift mined this property using two Cat D8H bulldozers to strip and push to the sluice box. A Cat 966 loader was used to remove tailings.

Twelve feet of overburden covered 3 to 4 feet of pay gravels which, along with 1 foot of bedrock, was sluiced at a rate of 50 cubic yards an hour.

Two cuts for a total of 25,000 cubic yards were mined. The wash plant consisted of a single run shaker plant with 1 inch riffles over nomad matting using 1500 igpm supplied by a 10 by 12 inch Trash pump powered by a GMC 671 engine.

Medium to fine grained gold with some nuggets were recovered with a fineness of 810.

CARIBOU CREEK 115 0 15d
(DOMINION CREEK) 63°49'N 138°50'W
Jim Stuart 1990
Water Licence: YPM86-116

This operation is situated between Caribou Creek and Lions Gulch.

The stratigraphy was found to be comprised of 12 to 15 feet of frozen black muck over 3 to 4 feet of pay gravel to bedrock.

Two miners working a single shift used a Cat D9G bulldozer and a Cat D8H bulldozer to strip the overburden and to stockpile pay gravels. A Cat 966 rubber tired loader was used to feed the sluice plant and remove tailings.

The wash plant consisted of a 3 foot wide by 30 foot long trommel with 2 sluice runs which had expanded metal over nomad carpet. Water was supplied to the plant using an 8 by 10 inch Canada pump, powered by a Volvo 150 HP engine at a rate of 1500 igpm. The wash plant processed 80 cubic yards per hour.

Gold was reported as coarse with some nuggets. Fineness was 840.

DOMINION CREEK 115 0 15d
Leo Arsenault 63°52'N 138°53'W
Water Licence: YPM89-034 1989, 1990

This two person operation was located on upper Lombard Pup, a left limit tributary to upper Dominion Creek. One Cat D9G bulldozer was used to excavate and push gravel and one Cat 225 backhoe was used to feed pay gravels into the wash plant and to clean out settling ponds. The dozer was also used to remove and stack tailings gravel. The wash plant was a trommel and single run sluice, 3 feet wide by 12 feet long, with angle iron riffles for the top four feet and then expanded metal. One 6 inch, high pressure pump, powered by a Ford industrial diesel and one 4 inch, self powered Honda pump provided about 400 gallons per minute which was used to process from 40 to 50 cubic yards per hour.

The stratigraphic section contained mixed, frozen layers of gravel and black muck for a depth of about 10 feet. The bedrock was broken into decomposed slabs and was slumped in places. All gravels plus as much as 6 feet of bedrock were processed through the wash plant. Water was pumped from and settled in an instream recycle pond.

Gold was fine to coarse with few nuggets and fineness was 850.

DOMINION CREEK 115 0 15d/115 0 15e
J.E. Yanisiw 63°50'N 138°49'W
Water Licence: YPM90-018 1990

Three miners worked a single shift using a Cat 225 excavator, Cat D6 bulldozer and a dragline with 1.25 cubic yard bucket to mine this property.

The wash plant was a double run 36 inch by 10 foot Super Sluice 6 processing pay gravel at a rate of 150 cubic yards an hour. Total recirculation was used. A 6 by 8 inch Allis Chalmers pump powered by a 471 Detroit engine supplied water at a rate of 1500 igpm.

Gold recovered was 40% above 4 mesh and 40% above 60 mesh and 20% above 150 mesh, with a fineness of 850.

UPPER DOMINION CREEK 115 0 15d
Discovery Mines 63°52'N 138°52'W
Water Licence: YPM89-097 1989, 1990

This two person operation has been located on Upper Dominion Creek for several years. One Cat D8 bulldozer was used to strip overburden and dig gravels and one Koehring backhoe was used to feed the wash plant. The wash plant was a small trommel and sluice box which processed about 60 yards per hour. A 6 by 6 inch Deutz water pump provided about 600 gallons per minute.

The stratigraphic section in 1989 and 1990 had up to 30 feet of frozen waste overburden on top of a gravel layer from 4 to 8 feet deep. The bottom 4 feet of gravel plus up to 2 feet of decomposed bedrock were sluiced. The mining cut went from rim to rim in the narrow valley bottom for a length of approximately 400 feet per year.

Water was pumped from an instream recycle pond. Water shortage required 100% recycle.

Gold recovered was coarse with quartz attached and fineness was from 780 to 800.

UPPER DOMINION CREEK 115 0 15d
Quality Box Company Limited 63°52'N 138°53'W
Water Licence: YPM89-063 1989

This two person operation was located on Upper Dominion Creek. One Komatsu 355 bulldozer was used for stripping overburden, one backhoe excavator was used to feed the wash plant and to dig drains and one Cat D8 bulldozer was used to remove and stack tailings. The wash plant consisted of a two deck screening plant 4 by 12 feet to minus 1/2 inch followed by sluice runs with pulsating riffles. One 8 by 6 inch Monarch pump powered by a Cummins diesel and one 6 by 5 inch Deutz pump were used to deliver about 1200 gallons per minute which was used to process approximately 60 to 100 cubic yards per hour.

The stratigraphic section was about 20 feet of frozen black muck overburden on top of about 5 feet of gravel with very decomposed bedrock with beige and green colouration. An area approximately 100 feet wide by 400 feet long was mined in 1989. Water was recycled.

Gold was all fine grained and fineness was around 800.

27 PUP, RIGHT FORK HUNKER CREEK 115 0 15d
Jerry and Elizabeth Ahnert 63°54'N 138°54'W
Water Licence: YPM90-068 1989, 1990

This two person operation was located on 27 Pup, a tributary to the right fork of Hunker Creek immediately above the confluence of the upper forks. One small loader was used to dig gravel and feed the sluice box. The stratigraphic section was 6 to 8 feet of black muck, 6 to 8 feet of waste gravel and the pay gravel layer only 12 to 18 inches thick on top of bedrock. This was a very small scale operation which processed 500 cubic yards or less each year.

Gold has been angular with dendritic filaments and fineness was 845.

RIGHT FORK HUNKER CREEK 115 0 15d
Paul Mahoney 63°54'N 138°53'W
Water Licence: YPM89-014 1990

This property is located on the Right Fork of Hunker Creek.

The owner and two other persons worked the property on a single shift basis.

A Bantam C350 hoe was used to perform all duties for the operation. The wash plant consisted of a homemade sluice box with a processing rate of 15 cubic yards per hour. Water was supplied by gravity feed.

The gold was mostly flat with a fineness of 830.

MINNIE BELL CREEK 115 0 15f
Wheelton's Exploration 63°54'N 138°34'W
Water Licence: YPM87-036RL 1989, 1990

This operation was located near the mouth of Minnie Bell Creek, a left limit tributary of Flat Creek.

John Wheelton has run this operation by himself in 1989 and most of 1990. An assistant was brought in for a portion of the 1990 season.

To date no sluicing has been done. A large cut has been stripped to gravels over the last few years. Between 15 and 20 feet of frozen black muck overlies an expected 15 feet of gravels which is layered with silt and black muck. Although the type of bedrock varies, Klondike schist shows up so far. The sluice section has yet to be determined but drill information indicates the lower 4 to 8 feet of gravel and 2 feet of bedrock will contain all the gold.

A Cat D8 bulldozer and a 46A bulldozer were used to strip the ground. Settling facilities were constructed for effluent generated by hydraulic stripping in a swamp adjacent to Flat Creek. Outflow back to Flat Creek occurred by seepage only.

As yet no gold has been recovered so no information is available on gold type or fineness.

ALLGOLD CREEK **115 0 15g**
John Alton **63°56'N 138°38'W**
Water Licence: YPM87-041 **1989, 1990**

This five person operation was located near the mouth of Allgold Creek, a left limit tributary of Flat Creek. One Cat D9H bulldozer was used to dig and push gravel. One Cat 980B front end loader and one Cat 966 front end loader were used to feed the wash plant and to remove tailings. An Insley H1000 backhoe was used for digging drains and two Cat D7 bulldozers were used for backup. The wash plant was a conventional derocker with spray bar feeding a triple run sluice with a center run equipped with punch plate on the top 8 feet and then angle iron riffles for 22 feet; the side runs were 4 feet wide by 20 feet long each with expanded metal riffles over nomad matting. An 8 by 10 inch Fairbanks/Morris pump, powered by a 371 GM diesel, provided approximately 2000 gallons of water per minute which were used to process about 150 cubic yards of gravel per hour.

The stratigraphic section averaged about 20 feet deep near the center of the valley bottom with 8 to 10 feet of black muck, and 8 to 10 feet of layered, frozen gravel. Bedrock was very clay-like and decomposed. All gravels plus about 2 feet of bedrock were processed through the sluice.

Water was pumped from an instream recycle pond on Allgold Creek.

Gold recovered was flattened and coarse grained with a fineness of 860.

GOLD BOTTOM CREEK **115 0 15i**
Ole Lunde **63°57'N 138°58'W**
Water Licence: YPM88-024 **1989**

Three miners worked 10 hour shifts per day for most of the mining season. The heavy equipment on site consisted of a Cat D7 bulldozer used for all mining duties and a Cat 950 loader which fed the box and removed tailings. The washplant type used here was a "Lunde Special" of which the operator, Mr. Lunde declines comment. A Duetz 8 by 8 inch pump powered by a six cylinder engine, pumping 1500 igpm processes an average of 30 loose yards per hour.

The stratigraphic section has a total depth of 20 feet all of which is frozen. Generally there is 10 feet of black muck over gravels. The bedrock is partially decomposed. All gravels and 3 feet of bedrock are processed through the sluice. Coarse waste was stockpiled and the fine waste was settled in ponds.

There was only one cut mined this season, approximately 50,000 bedrock feet was the total volume. Depth of cut could not be determined, thus the use of bedrock square feet. Water aquisition to the mine was an instream reservoir with the settling pond being out-of-stream.

The gold recovered was fine grained with a fineness of 780.

HUNKER CREEK **115 0 15i**
Jack and Ian Fraser **63°58'N 138°58'W**
Water Licence: YPM88-031 **1990**

This operation mined a left limit hillside of Hunker Creek approximately one half mile downstream from the mouth of Gold Bottom Creek.

As this operation has progressed into the hillside the stratigraphic section has increased in depth because the bedrock has not sloped upwards. The 1990 cut consisted of 2 feet of organics overlying 60 feet of frozen black muck and slide rock from the hill above. Between 4 and 10 feet of pay gravels sit on a mica schist bedrock which tends to be soft and decomposed for about 2 feet. In some areas old timers' workings on the hill above left tailings on top of the black muck. The old timers' tailings, all the gravels and the first 2 feet of bedrock were sluiced. One cut 300 feet long by 40 feet wide was stripped and sluiced in 1990. A cut roughly the same size was stripped and partially sluiced in 1989. Some material stockpiled during the 1989 season was sluiced in 1990. The depth of the gravel strata decreased in 1990 from previous years.

This mine is a family operation. Three full time family members and one more working part time ran this operation in 1990.

A Cat D8 bulldozer, a Cat D6 bulldozer and a Cat 950 front end loader were used. The D8 bulldozer was used on a part time basis to rip and blade out the frozen pay gravels. The D6 bulldozer was used as the main dozer for feeding the sluice box. The 950 loader stock piled the pay gravels for sluicing and carried the tailings away. Most of the stripping was done with a hydraulic monitor through the months of June and July each year. Sluicing of the pay gravels was done in August and September.

The sluice plant consists of a conventional dump box attached to a single sluice run. The dump box measures 22 feet long by 7 feet wide. The lower 10 feet is lined with nomad matting, expanded metal and punch plate. The upper portion of the dump box is left as a slick plate. The sluice run is 4 feet wide by 24 feet long. The first 8 feet uses nomad matting, expanded metal and screen plate. The bottom 16 feet of the sluice run uses nomad matting, fine expanded metal and 3 inch angle iron riffles. The processing rate was estimated at 35 cubic yards per hour while using 1500 igpm of water. Water was pumped from a pump pond on Hunker Creek to the hydraulic monitor or the sluice box. A 10 by 8 inch Monarch pump powered by a 471 G.M. diesel engine supplied the water. A bedrock drain approximately 800 feet long serves as a pre-settling pond and removes most of the larger settleable solids. A downstream settling pond 150 feet wide by 1100 feet long provides final effluent treatment prior to outflow back into Hunker Creek. This large out-of-stream settling pond handles the effluent from both the monitoring and sluicing.

The gold recovered was screened to 4% greater than 10 mesh, 80% less than 10 mesh but greater than 60 mesh and 16% less than 60 mesh. The gold was flat and very little quartz occurs. Fineness varies between 810 to 820.

HUNKER CREEK	**115 0 15i**
Jim Stuart	**64°02'N 139°13'W**
Water Licence: YPM89-101	**1990**

This mine is located on a first tier, right limit bench of Hunker Creek approximately 1 1/2 miles downstream from Gold Bottom Creek. Jim Stuart began mining this site mid way through the 1990 season. Part of the mining season was taken up by the move from Dominion Creek and setting up at this location.

A bulk testing program on the rim was done in 1990. The depth to bedrock was about 15 feet through mainly thawed ground on the rim. From the results of test holes located further in on the bench an estimated 6 to 8 feet of surface clay material overlie 15 to 20 feet of fine brown gravel. Between 6 and 7 feet of White Channel gravel has been found beneath the brown gravels and on top of a decomposed bedrock. Fractured angular bedrock is beneath the decomposed bedrock. The lower 2 feet of brown gravels, all of the White Channel gravels and approximately 1 foot ot the decomposed bedrock is sluiced. One rim cut measuring 200 feet long by 100 feet wide was sluiced in 1990.

Jim Stuart and his son ran this operation in 1990 on a single regular shift.

A Cat D9G bulldozer, a Cat D8H bulldozer, a Cat 966 loader and a Hein Warner 1 yard hoe was used. The D9G stripped the ground. Some of the 1990 workings had been previously stripped and were largely thawed. The D8H cleared tailings and the 966 loader fed the sluice plant. The hoe was surplus to the operation except for occasional odd jobs.

The sluice plant consists of a 50 inch diameter by 30 foot long trommel used to classify the pay for two 60 inch wide by 8 foot long sluice runs. The trommel is lined with crusher screen which classifies to - 1 inch. The first 2 feet of the sluice run uses hydraulic riffles. The remainig 6 feet uses nomad matting and expanded metal. Approximately 1200 igpm is used to sluice a maximum of 80 cubic yards per hour. Water is pumped from an instream pump pond in Hunker Creek. A 6 by 8 inch Monarch pump powered with a 671 GMC diesel engine pumps 1000 igpm of water up onto the bench to a holding pond. The holding pond is then used as a recycle/settling pond with no discharge except by seepage. An 8 by 10 inch Canada pump powered with a 150 HP Volvo engine provides water to the sluice plant.

The gold recovered is very fine grained and tends to be flat and smooth. At the time of inspection no gold had been sold therefore the fineness has not been determined.

HUNKER CREEK	**115 0 15i**
Herman Liedtke	**63°57'N 138°58'W**
Water Licence: YPM89-013	**1989**

This two person operation was located on Hunker Creek immediately downstream from Mint Gulch. One Cat D8H bulldozer was used to dig and push gravels, one Cat 966 front end loader fed the gravels into the wash plant, one Cat 988 front end loader was used to remove and stack tailings and one drag-line with a 1/4 yard bucket was used to clean drains and settling ponds. The wash plant was a 10 feet wide by 24 feet long dump box lined with slick plate and a single sluice run 36 inches wide by 20 feet long with angle iron riffles over nomad matting. A 10 by 12 inch water pump powered by a 140 HP Perkins engine delivered approximately 1500 igpm which was used to process about 70 cubic yards per hour.

The stratigraphic section was about 20 feet of frozen black muck on top of a gravel layer from 4 to 6 feet deep. Bedrock was decomposed Klondike schist. All gravel plus 1 or 2 feet of bedrock were sluiced. Frozen overburden was removed hydraulically using a water monitor. Three cuts were mined in 1989 approximately 250 feet long by 20 feet wide each. An area of old dredge tailings approximately 600 by 150 feet by 10 feet deep was also mined.

Water pumped from an instream pond and wastewater was settled in one large instream settling pond.

Gold recovered was all flattened fines with no quartz. Fineness was 825.

MINT GULCH **115 0 15i**
(HUNKER CREEK) **63°52'N 138°53'W**
J. Erickson **1990**
Water Licence: YPM89-059

Two miners and one other person worked one twelve hour shift using a Cat D8 bulldozer for stripping, a Cat 966 loader to feed the sluice box and a Cat 988 loader for tailings removal.

The ground consisted of 12 feet of frozen black muck over four feet of gravel with decomposed schist bedrock. All gravels plus 1 foot of bedrock were sluiced at a rate of 100 cubic yards an hour.

The wash plant consisted of a dump box and a single run sluice.

Gold recovered had a fineness of 820.

GOLD BOTTOM CREEK **115 0 15i**
Mogul Gold **63°58'N 138°53'W**
Water Licence: YPM88-024 **1990**

This operation is located at the mouth of Goldbottom Creek. The deposit consists of a 10 foot layer of old timer's tailings covering a 15 foot thick layer of black muck on top of 5 feet of pay gravel. All of the gravel and two feet of bedrock were sluiced.

Three miners ran the operation in 1990, on a single shift basis.

Equipment consisted of a Cat D8H bulldozer used for stripping and pushing up pay. A Cat D6C bulldozer fed the sluice box.

A Conventional sluice box was used which had a processing rate of 30 cubic yards per hour.

The gold recovered was predominantly coarse gold with an average fineness of 800.

BEAR CREEK **115 P 9**
P. Tyerman **63°39'N 136°22'W**
YPM88-021 **1989,1990**

The property is located on what is know locally as Carlson Creek which is a tributary to the upper reaches of Bear Creek. Mining in 1989 continued upstream from where it terminated in 1988.

The depth to bedrock averaged about 30 feet. Overburden was not frozen and consisted of 1 foot organic material overlaying 10 feet of fine gravel, 4 feet of large boulders and gravel and about 15 feet of old channel gravel. Clay was mixed through out the section. Bedrock is decomposed schist. All the gravel and a small portion of bedrock was sluiced.

The crew consisted of three miners, working an eight hour shift, and a cook.

A Komatsu D65S loader with a 3 yard bucket removed tailings. A Komatsu D60A bulldozer was used for stripping and to remove the tailings. A JSW excavator with a 1 1/4 yard bucket was used for stripping and feeding pay to the wash plant. The overburden was bladed off to the side and the tailings were stockpiled for future road construction. Working space was limited as the creek channel is quite narrow.

The wash plant consisted of a 20 by 8 foot dump box, and a single run sluice 34 inches wide and 20 feet long. The box was lined with angle iron riffles, (8 feet of 1/2 inch diameter hole punch plate) and burlap matting. A gold screw was used to clean up the concentrate. Approximately 250 yards are processed per day. Three cuts were mined in 1989 for a total of 25,000 cubic yards sluiced and 6,000 cubic yards stripped.

A pipeline constructed from 45 gallon drums conveyed water a short distance from the creek to the sluice box at a rate of 1,000 igpm. Water was in short supply in 1989 and part of 1990. The effluent was treated in a series of small instream ponds.

The gold is flat and flaky with 75% being greater than 10 mesh in size. Some platinum, hematite, magnetite, iron pyrite and garnets are found in the concentrate.

MCQUESTEN RIVER **115 P 11**
J. Rustenburg **63°37'N 137°08'W**
Water Licence: YPM89-178 **1989, 1990**

This operation is located about 10 miles upstream from the mouth of the McQuesten River on the left limit. The mine site is in the floodplain about 1 mile from the McQuesten River but is not joined by an active channel. Depth to bedrock is about 125 feet through old river gravels. Approximately 25 feet of this deposit will be mined. Six feet of black muck and some of the gravel is frozen. A small amount of material was processed in 1989. During 1989 the crew consisted of one miner working a ten hour shift. No activity was observed in 1990 but the site does not appear to have been abandoned.

A Hough 65 loader with a 3.25 yard bucket was used to strip overburden.

A floating dredge, consisting of a 30 by 12 foot dump box lined with 1/2 inch punch plate was under construction. The suction pump is a 6 by 8 inch Monarch powered by a 120 HP Cat motor. The 1/2 inch minus material will be transported via a pipe to various secondary processing systems including a 3/16 inch classifying screen, a centrifugal spinner, a sand screw, a spiral and a boil box. The final configuration of the system will be determined through experimentation. The dump box will float in the pond and the other equipment will be mounted on barges. The dredge will create and fill in its own pond as mining progresses.

Ground water will fill the pond and will be used by the dredge at a rate of 1500 igpm. The effluent will also be settled out in the pond.

The gold is fine grained with a fineness of 870.

BARLOW CREEK **115 P 13**
Ray Lizotte **63°44'N 137°38'W**
Water Licence: YPM89-124 **1989, 1990**

This property is located on Barlow Creek about 5 miles upstream from its junction with Clear Creek. A small 5,000 cubic yard test was done on a bench claim and in the main creek channel in 1989. 1990 was the first full year of operator at this location. The creek is relatively narrow with a moderate gradient. Two cuts measuring 20 feet wide by 500 feet long by 12 feet deep and 25 feet wide by 200 feet long by 12 feet deep were made in the stream channel. Approximately 7,000 cubic yards were sluiced. Bedrock was not reached in 1989.

Ray Lizotte worked alone for about 12 hours per day in 1989 but had a helper in 1990.

A Cat D7 bulldozer with angle blade was used for stripping overburden and pushing up pay. A Cat 988 rubber tired loader with a 6.5 yard bucket was used to feed the box and remove tailings.

The wash plant upgraded from a single run sluice 4 feet wide by 40 feet long to a 8 feet wide by 16 feet long hopper with spray bar which feeds material into a 32 feet long by 7 feet diameter trommel. Material smaller than 1 inch is fed into a 4 feet by 8 feet single run sluice lined with expanded metal. Material smaller than 1/4 inch is classified by punch plate and fed to an undercurrent consisting of two pulsating sluice runs measuring 3 by 6 feet. The processing rate is 60 yards per hour. A gold wheel and small pulsating riffle is used to clean up.

Water was pumped out of a bypass channel at a rate of 700 igpm with a 10 by 12 inch pump powered by a 3208 Cat motor. Effluent was treated in a series of small instream ponds directly below the wash plant and by a large out-of-stream pond about 1.75 miles below the mine site. The small ponds were cleaned out regularly with the Cat dozer. The total flow of Barlow Creek was treated. The creek was bypassed around the large pond at the end of the season.

The gold was coarse and flaky with nuggets up to .25 ounces. About half the gold was larger than 12 mesh. Hematite and tin were found in the concentrate.

LEFT FORK CLEAR CREEK	**115 P 13**
Erl Chesney	**63°46'N 137°39'W**
Water Licence: YPM88-119	**1989, 1990**

This operation was mined under J. Klassen's water licence. This property is located on Left Fork Clear Creek approximately 1 mile upstream from the fork. The area had been dredged previously and the operator was mining the side pay left by the dredge. 1989 was the operator's first year of mining in this locality. Three cuts were mined; the first below 65 pup at the old airstrip and the other two just upstream of 65 pup. The cuts averaged 8 feet deep and consisted of 3 feet of frozen black muck, 1 foot of coarse river gravel and sand, 2 feet of coarse gravel and 1 1/2 feet of broken, blocky, decomposed bedrock. Two feet of coarse gravel and 1 1/2 feet of bedrock were sluiced.

The crew consisted of 4 miners and 1 helper working a 12 hour shift.

A Cat D8 dozer with U blade and ripper was used for stripping. A 418 P & H excavator with 1 1/2 yard bucket was used to feed the box. A Cat 930 loader with 2 yard bucket and Cat 950 loader with 3 yard bucket were used to remove tailings.

A 5 cubic yard water feed hopper directed material to a 7 feet diameter by 35 feet long trommel. The trommel fed material to a 36 inch diameter x 10 feet long centrifugal drum. The drum had baffles every 2 feet. The processing rate was 100 cubic yards per hour. A millspex reverse spiral was used to clean up after every 3000 yards through the trommel.

Approximately 30,000 cubic yards were sluiced and 30,000 cubic yards stripped in 1989. In 1990, 3,000 cubic yards were sluiced and 25,000 yards were stripped. Overburden was pushed up side hills and tailings were stacked in old cuts.

Water was pumped out of a small pump pond dug into the banks of Left Fork Clear Creek. A 3 inch submersible Flyt pump supplied water through a 6 inch diameter aluminum pipe at a rate of 600 igpm. The pump was powered by a 65 KVA generator driven by a Perkins diesel. The generator also supplied motive power to the trommel. A series of dredge ponds with a combined length of 1500 feet were used to treat the effluent. There was no surface discharge from the ponds. Effluent seeped through the gravel and into Left Fork Clear Creek which ran parallel to the ponds.

The gold was fine grained and flat with only 1% being greater than 10 mesh. Scheelite, barite, hematite and magnetite were found in the concentrate.

CLEAR CREEK	**115 P 13**
4757 Yukon Ltd	**63°46'N 137°22'W**
Water Licence: YPM86-131A	**1989, 1990**

This property is located on Clear Creek approximately 1.5 miles downstream from its confluence with Left Fork Clear Creek. Four cuts on the right limit were mined upstream from the 1988 workings. The depth of the cut averaged 13 feet and consisted of 1 foot of black muck and sand, 10 feet of coarse quartzite gravel up to 3 inches in diameter and 2 feet of decomposed schist bedrock, hard quartzite and granite bedrock. 10 feet of gravel and 2 feet of bedrock were sluiced. The river gravel has been reworked by glaciation. The silt and black muck was frozen in places. The gravel and up to 2 feet of bedrock were put through the wash plant.

The operation is family run and consisted of 6 miners and 1 helper. One 12 hour shift was worked. Double shifts were worked for 3 weeks in July.

Two Cat D9H bulldozers with U blades and 4 barrel rippers were used to strip overburden and stockpile paydirt. Ground was stripped 1 to 2 years in advance. Two Cat 966D loaders with 4 yard buckets were used for feeding the wash plant and removing tailings.

The wash plant consisted of a 10 x 24 feet derocker with spray bar and 4 run sluice 35 feet long. The sluice runs take 1.25 inch minus material and are set at a grade of 2 inches per foot and lined with a combination of hungarian riffles, punch plate, expanded metal and perforated belting. The derocker is run by an electric motor powered by a 125 KW Cat 3304 generator set. Approximately 80 yards per hour are processed.

A total of about 100,000 cubic yards were sluiced in 1989 and 1990 and 600,000 stripped. Tailings were used to build a protection dike on the bypass channel and to fill in old cuts. Overburden was pushed into windrows in the centre of the valley. The sluice box is moved approximately once a month as mining proceeds upstream.

The generator also runs two 6 inch Flyt submergible pumps which supply water to the sluice box and spray bar at a rate of 1900 igpm. Water was pumped directly out of a diversion ditch. Effluent is treated by a series of long, out-of-stream ponds. The level of the ponds was raised 4 feet in 1989.

The gold is flat, fine grained with a few nuggets. The fineness is .820 with 10% silver. Gold smaller than 125 mesh was recovered.

RIGHT FORK CLEAR CREEK **115 P 13**
Prospecta Contracting Ltd. **63°46'N 137°00'W**
Water Licence: YPM89-005 **1989, 1990**

This property is located on the right fork of Clear Creek about 1/2 mile upstream from Quartz Creek. The ground had been previously worked by Queenstake's dredge. The operator is mining four small areas left behind by the dredge on both sides of the creek. The valley is wide and the stream gradient low at this location. The cuts averaged 16 feet deep with 15 feet of coarse stream gravel up to 1 foot in diameter and 1 foot of decomposed schist bedrock mixed with clay. The lower 2 feet of gravel and 1 foot of bedrock was sluiced.

Dick Board and Bruce Rittel worked a 12 hour shift. Dick's wife and daughters worked in camp.

A Komatsu D115 bulldozer with U blade and ripper was used for stripping, pushing up pay and removing tailings. A Bantum 260 excavator with a 3/4 yard digging bucket and a 1 1/2 yard clean up bucket was used to dig drains and feed the trommel.

A 6 by 5 feet wet hopper fed material to a 5 feet in diameter by 40 feet long tromel driven by a 30 HP electric motor. The trommel was lined with 28 feet of punch plate and equipped with a spray bar. The trommel fed material to a 24 feet long sluice run lined with expanded metal and coco matting. A 16 feet long side run was lined with 8 feet of 1 inch flat riffles and 8 feet of expanded metal over coco matting. The processing rate was between 80 and 100 cubic yards per hour. A long tom and pan were used for clean up.

32,000 cubic yards were sluiced and 60,000 cubic yards stripped in 1989. In 1990, 30,000 cubic yards were sluiced and 50,000 cubic yards stripped. Overburden was pushed up the side hills. Tailings were pushed into old cuts in the valley bottom.

Water was pumped out of a pump pond connected to the Right Fork of Clear Creek at a rate of 800 igpm by an 8 inch Allis Chalmers pump powered by a 60 HP electric motor. Electricity was supplied by a 100 KW generator run by a Volvo engine. Effluent was treated in a series of 4 settling ponds. The 3 downstream ponds were built out of old dredge ponds. The upstream pond was constructed out of old cuts. Total creek flow was run through the ponds for part of the season.

The gold was flat and well travelled with 50% larger than 16 mesh. No large nuggets were found. Large quantities of magnetite and hematite and some scheelite were found in the concentrate

CLEAR CREEK **115 P 13**
West Coast Paving **63°45'N 137°20'W**
Water Licence: YPM89-099 **1989, 1990**

This property begins 6 claims above Squaw Creek and extends downstream along Clear Creek for 22 claims. Mining took place at the downstream portion of the property in 1989. The ground was frozen and averaged 15 to 20 feet deep. The ground consisted of 8 to 10 feet of black muck, 5 feet of coarse river gravel with boulders up to 3 feet in diameter and 4 to 5 feet of fractured, decomposed granite, quartz and schist bedrock which occurred in reefs and troughs. The gravel and bedrock were sluiced.

Ten miners and 2 helpers worked two 10 hour shifts.

A Cat D9L bulldozer and a Cat D8K bulldozer, both with U blades and rippers, were used for stripping overburden and pushing up pay. A Cat 235C excavator was used to feed the wash plants, dig drains and berm up settling ponds. An Cat 980C loader was used to remove tailings.

Material was classified to 1 inch minus by a Super Sluice finger derocker which fed a 6 by 20 foot orbiting box. The box was lined with 5 feet of pipe riffles followed by 15 feet of expanded metal over Nomad matting. A Ross box type wash plant was added in August. A 10 x 12 foot hopper was lined with 1/2 inch punch plate. Material larger than 1/2 inch passed over the main run lined with hungarian riffles. Material smaller than 1/2 inch passed over the two side runs which were lined with riffles over Nomad matting. The sluice runs were 3 inch wide by 20 feet long. The combined processing rate was 220 to 240 cubic yards per hour. A pulsating jig, long tom and reverse spiral were used for clean ups.

Four cuts were mined in 1989 for a total of 150,000 cubic yards sluiced and an additional 140,000 cubic yards stripped. The overburden was pushed up side hills. Tailings were used to fill in old cuts and stacked in windrows.

Three locations were mined in 1990. One cut measuring 700 feet long by 250 feet wide by 15 feet deep (including 9 feet of overburden) was taken at the downstream property boundary. One cut measuring 700 feet long by 250 feet wide by 18 feet deep (including 6 feet of overburden) was mined just upstream of Squaw Creek. A continuous cut 2500 feet long by 150 feet wide by 22 feet deep (including 12 feet of overburden) was made upstream of the 1989 workings. The overburden was pushed up side hills. Tailings were used to fill in old cuts, build up settling pond berms, armour black muck piles and stacked in windrows. A total of 150,000 cubic yards were sluiced and 200,000 cubic yards stripped in 1990.

Water was supplied to the wash plant at a combined rate of 1,200 igpm by a 6 by 8 inch Cornell pump driven by a 3208 Cat diesel. Water was pumped directly out of Clear Creek and effluent treated in a small pond. Settling was problematic in 1989.

Gold was flat, thin and fine with very few pieces of coarse gold. The fineness was between 840 and 850. Some black sand was found in the concentrate.

CLEAR CREEK	**115 P 13**
Nechako Contracting	**63°37'N 137°38'W**
Water Licence: YPM88-126	**1989, 1990**

This operation was located on Main Clear Creek several miles upstream of its junction with Barlow Creek. 1990 was the second year of mining for the operation. Three cuts were taken out in 1989 and two cuts were made in 1990 measuring 200 feet by 250 feet and 500 feet by 300 feet respectively. Approximately 120,000 cubic yards were washed and 73,000 cubic yards stripped (100,000 cubic yards were sluiced in 1989). Two feet of black muck and the top 6 feet of gravel were stripped. 10 to 12 feet of stream gravel interspersed with silt and clay and 2 to 4 feet of bedrock were sluiced. Bedrock was hard but did not require ripping. The organic overburden was stockpiled for future restoration work. Coarse tailings were used to construct a channel for the stream upon abandonment. Fine tailings and overburden were stacked on the left limit away from the reconstructed channel. Clear Creek was diverted to the left limit for a distance of 350 yards upstream of the 1989 workings. Some stripping was done in preparation for 1991.

A crew of 5 miners and 1 helper worked a 14 hour shift.

View of trommel wash plant operated by Nechako Contracting, with side sluice run feeding material to Cyclones on Clear Creek.

A Cat D9H bulldozer with U blade stripped overburden and pushed up pay. A Cat 235 Excavator with 1 3/4 yard bucket was used for ditching, to build up berms and to feed the trommel. A Terex 7271B loader with an 8 yard bucket was used to remove tailings. A Cat 988 loader with a 4 1/2 yard bucket was used as a backup machine.

An 8 by 12 feet hopper fed material to a 78 inch diameter, 57 feet long trommel . A 60 HP Vacuseal 6 by 8 inch slurry pump supplied material smaller than 1/2 inch to 6 hydrocyclones. One foot minus material passed over an 18 inch wide by 10 foot long single run sluice lined with hungarian riffles. The trommel level was hydraulically controlled. The hydraulics were powered by a 60 HP electric motor driven by a 175 KVA Cat generator. The processing rate was 150 cubic yards per hour. Clean up was done with a reverse spiral and an additional cyclone. A smaller trommel (66 inch diameter by 37 feet long) with an 80 cubic yard capacity was used for testing. This trommel fed a twin run sluice. One run (30 inches wide by 20 inches long, lined with hungarian riffles and expanded metal) took material smaller than 1/2 inch. The other run (24 inches wide by 20 inches long lined with hungarian riffles and expanded metal) took minus 1 inch material.

Water was taken from Clear Creek through a short diversion channel and pumped by a 6 by 8 inch pump driven by a 471 Detroit diesel. Effluent was treated in one small downstream and two larger upstream ponds. The downstream pond filled up half way through the season requiring the construction of the two upstream ponds.

70% of the gold was smaller than 50 mesh. 5% was medium grained with no coarse gold. The fineness averaged 840. Very fine (i.e. "smoke") gold recovery was possible with the hydrocyclones.

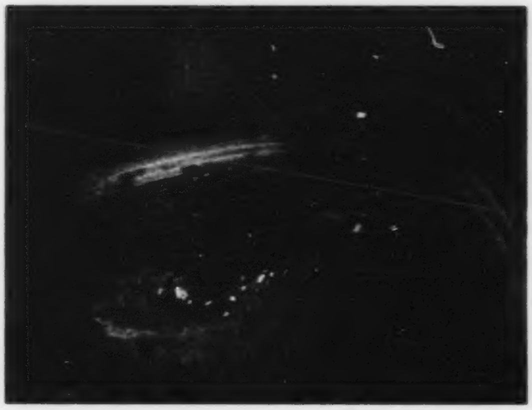
LEFT FORK, CLEAR CREEK 115 P 14
T. Bazylinski 63°51'N 137°06'W
(River Rat Mining) 1989
Water Licence: YPM87-005R
YPM89-069

This property is located along the headwaters of the left fork of Clear Creek, approximately 2.5 miles upstream from the mouth of Lewis Gulch. Mining proceeded about 600 feet upstream from the 1988 workings. Work took place in a narrower portion of the valley in 1989, resulting in less room for disposing of waste material. No work was done in 1990. The stream gradient is steep. The depth of ground increased from 20 to 50 feet, consisting of 30 feet of slide rock, 10 feet of conglomerated gravels, 4 feet of broken rock and clay and decomposed schist bedrock. All material was sluiced except for the slide rock.

In 1989 the operator sluiced 100,000 cubic yards from three cuts. Tailings were stacked in old cuts and on side hills. Approximately 100,000 cubic yards were stripped. Overburden was pushed down the valley.

Work was carried out by 4 miners and 2 helpers, working two 10 hour shifts.

Heavy equipment was upgraded in 1989 with a Cat D9 bulldozer with straight blade and ripper, a Clark 75B rubber tired loader with a 3 1/2 cubic yard bucket and a Bantam C166 Excavator with a 7/8 cubic yard bucket. The bulldozer was used to strip and push up pay. The loader fed the excavator and removed tailings. The excavator was used to feed the wash plant. The John Deere 644 Loader with a 2 cubic yard bucket was used as a stand by machine.



Sluicing at T. Bazylinski's operation on the Left Fork Clear Creek.

The wash plant consisted of a 3 x 8 feet wet shaker which classified material to minus 4 inch. A 20 feet long, 4 feet diameter trommel fed 1 1/2 inch minus material to a 6 feet wide by 20 feet long orbiting sluice box. The sluice box was lined with pipe riffles over expanded metal and Nomad matting. The processing rate was 50 cubic yards per hour.

Water was supplied to the wash plant at a rate of 500 igpm by an 8 inch diameter by 500 foot long gravity fed pipe. The pipe line was supplied by an instream reservoir 35 feet in elevation above the wash plant. Effluent was treated in two out-of-stream and one instream pond. The ponds were constructed of coarse tailings. The ponds were bailed out with the excavator several times as they filled up rapidly with sediment.

The gold was coarse grained and angular with a fineness of 730.

LEFT FORK, CLEAR CREEK 115 P 14
Blackstone Placer Mining 63°51'N 137°07'W
Water Licence: YPM89-084 1989, 1990

This property is situated along the upper part of the left fork of Clear Creek. Mining proceeded 500 feet upstream from where operations ceased in 1988. The ground had been stripped previously for a dredge which never operated in this location. Some of the area had been mined with a bulldozer. The deposit consisted of 12 feet of channel gravels. Bedrock was mainly decomposed schist. The ground was not frozen. Some competent bedrock occurred as reefs across the valley bottom. The channel gravel, including old tailings and 1 foot of bedrock, were sluiced.

Work was carried out by Nelson Harper and five miners. One ten hour shift was worked per day.

Three Cat D8 bulldozers and one Cat D7 bulldozer were used for stripping overburden, stockpiling pay and building protection berms, roads, etc. Two Hough 90E loaders with 4 cubic yard buckets, were used to feed the sluice box and remove tailings.

The wash plant consisted of a 5 foot diameter trommel and two sluice runs. The trommel is fed by a 5 yard hopper and lined with four 6 inch high inner rings and six sections of 6 x 6 inch by 5 feet long angle iron which help wash the material. The trommel screens 1/2 inch minus material into a 4 feet wide x 20 feet long sluice, lined with coarse expanded metal. The second sluice run takes 2 inch minus material, is 20 feet wide x 10 feet long and is lined with 2 feet of 2 inch angle riffles and 8 feet of 1 inch angle riffles. Nomad matting is used under the riffles and expanded metal. The sluice box was set at a grade of 1 1/2 inches to the foot. The processing rate was 50 cubic yards per hour. Production for 1989 and 1990 was estimated at 80,000 cubic yards. Approximately 11,000 cubic yards were stripped. Half the stripping was done in preparation for 1991. Tailings were levelled and used to construct a protection berm beside the creek which also functions as a road.

Water was pumped to the wash plant at a rate of 1500 igpm through a 600 foot long steel pipeline (200 feet of which was 12 inch diameter and 400 feet was 8 inch diameter) by a 6 inch Allis Chambers pump, powered by a 60 HP Perkins diesel. The pump motor also powered an hydraulic pump which turned the trommel. An out-of-stream reservoir supplied water to the pipeline. A settling pond upstream of the reservoir was used to improve the quality of the water before pumping it to the wash plant. Effluent was treated by a series of out-of-stream ponds measuring approximately 25 yards by 30 yards each. New ponds were added as needed.

The gold was described as 90% fine and 10% coarse with the odd nugget. The fineness was between 790 and 820.

CLEAR CREEK 115 P 14
Sisters Resources 63°47'N 137°27'W
Water Licence: YPM89-098 1990

This property is located on Clear Creek and begins 6 claims below Squaw Creek and extends 9 claims downstream. One continuous cut was made starting at the downstream boundary and extending 2000 feet upstream. The cut was 150 feet wide by 13 feet deep. Six wash plant moves were required to process the material.

The deposit consisted of 6 feet of black muck over 7 feet of post glacial gravels and some old channel gravels. The old channel was discontinuous and disappeared under the hillside at various locations. Granite and quartz bedrock occurred in hard reefs. Six feet of gravel and 3 feet of bedrock were sluiced. The black muck was ripped and pushed up the hillsides while frozen. Coarse tailings were used to armour black muck piles located near the stream coarse. Approximately 100,000 cubic yards of material were sluiced and 40,000 cubic yards stripped.

Five crew worked a 12 hour shift.

A Cat D8L bulldozer with 4 barrel ripper was used for stripping and pushing up pay. A Cat 980C rubber tire loader with a 5.25 yard bucket was used to remove tailings and feed the excavator. A Cat 225 excavator with a 2 yard clean up bucket was used to feed the derocker.

A 10 yard (14 by 13 feet) wet hopper fed material to a Super Sluice 6. The classified material from the finger derocker was then processed by a 6 foot wide by 20 foot long single run sluice. The top 10 feet of the sluice was lined with angle iron riffles. The bottom 10 feet was lined with expanded metal and nomad matting. The processing rate was 100 cubic yards per hour.

An Aurora 6 by 8 inch pump powered by an Isuzu engine supplied water to the wash plant at a rate of 1200 igpm. The water was pumped out of Clear Creek.

Effluent was treated in a 125 foot wide by 300 foot long by 10 foot deep settling pond which was built up as required.

Gold was flat, thin and fine grained with very few pieces of coarse gold. The fineness was .840. Some black sand, hematite and pyrite, were found in the concentrate.

CLEAR CREEK 115 P 14
Gordon's Placer 63°45'N 137°15'W
Water Licence: YPM89-139 1989, 1990

This operation is located on Main Clear Creek just upstream of Henry Creek. Cuts were mined in 1989 and 1990 at the upstream portion of the property and at the downstream end. The average depth of material was 16 feet, consisting of 3 to 4 feet of sandy muck, 4 to 8 feet of river gravel and 2 to 4 feet of granodiorite with feldspar phenocrysts. The bedrock occurred in hard ridges and decomposed troughs up to 4 feet deep. The gold values were concentrated in the troughs. Approximately 4 feet of gravel and 4 feet of bedrock were sluiced.

Work was done by 2 miners and 2 helpers working two 9 hour shifts.

A Cat D9H bulldozer with U blade and ripper was used to strip overburden and push up pay. A Cat 966C rubber tired loader with a 3 yard bucket was used to feed the wash plant and remove the tailings. A John Deere 450 tracked loader with back hoe was used for testing, trenching and as a backup machine. A Cat D7G bulldozer was used to remove tailings.

A 9 foot wide by 12 foot long dump box fed a Ross style sluice box consisting of a 36 inch wide by 16 foot long main run and two 36 inch wide by 16 foot long side runs. The main run was lined with 3/4 inch punch plate in the throat and 2 1/2 inch hungarian riffles over expanded metal and matting throughout the remainder of the run. The top half of the side runs are lined with 1 inch hungarian riffles; the bottom half with expanded metal over Nomad and coco matting. The processing rate was 50 to 75 cubic yards per hour. A long tom and pulsating jig were used to clean up the concentrate.

A total of 65,000 cubic yards were sluiced from the three cuts. 27,000 cubic yards were stripped from the 1989 cuts and an additional 4,500 cubic yards stripped in preparation for 1990. Overburden was piled on existing tailings and side hills. Tailings were placed back into old cuts.

Water was supplied at a rate of 2000 igpm by a 10 by 10 inch Gorman Rupp centrifugal pump. Water acquisition varied with wash plant location. Water was taken from Clear Creek, a short ditch and channel diversion. Location of effluent treatment also changed with wash plant location.

Gold was mostly fine grained and flaky. Colour varied from bright yellow to copper coloured (possibly effected by iron pyrite). Hematite and chalcopyrite were found in the concentrate. Fineness averaged 840 with 14% to 15% silver.

CLEAR CREEK 115 P 14
Neil Duncan 63°45'N 137°15'W
Water Licence: YPM89-139 1989

This operation mined under Gordon Placers water licence. The property is located on Main Clear Creek just upstream of Henry Creek. This is the operators first year at this location. Five cuts were mined in the valley bottom in 1989. The ground averaged 10 feet in depth, consisting of 3 to 4 feet of coarse alluvial gravel over 6 feet of Klondike (i.e. schist) fractured bedrock. The bedrock occurred as decomposed troughs and hard ridges. Pay values were better in the troughs. In some areas, up to 6 feet of clay overlay the stream gravels. Some of the ground was frozen and a little black muck was encountered. 1 to 2 feet of alluvial gravel and up to 7 feet of bedrock were sluiced.

The crew was made up of 8 miners and 1 helper working two 11 hour shifts.

A Cat D9H bulldozer with U blade and 4 barrel ripper was used for stripping and pushing up pay. A Komatsu 155 bulldozer with angle blade and ripper was also used to push up pay. A Terex loader with a 4 1/2 yard bucket was used to feed the wash plant. A 125B Michigan loader with 4 yard bucket was used to remove tailings.

Material smaller than 6 inches passed through a wet grizzly into a hopper which fed an 11 foot long by 31 inch wide conveyor belt. The belt deposited material onto a 4 by 8 foot vibrating screen deck. Waste material was removed from the screen deck by a 36 inch wide belt. Half inch minus material was pumped by an 8 by 6 inch slurry pump to two 4 feet wide by 20 feet long sluice runs lined with expanded metal & 1 inch grating over astroturf and Nomad matting. The wash plant was powered by hydraulic pumps driven by electric motors. Material was processed at a rate of 90 cubic yards per hour. A 24 inch diameter by 8 foot long reverse spiral and a pulsating jig were used to clean up the concentrate.

A total of 100,000 cubic yards were sluiced from 5 cuts. Approximately 75,000 cubic yards were stripped. Overburden was pushed into old cuts and tailings were stacked in windrows in the valley bottom.

Water was supplied from Clear Creek to the wash plant by a 6 inch submersible pump. A 125 KVA generator powered by a 3306 Cat diesel motor supplied electricity to the pump and to the motors on the wash plant. Water was used at a rate of 1500 igpm. Effluent was treated in a number of out-of- stream ponds. Several different ponds were used as the location of the wash plant changed.

The gold was fine grained with very little coarse gold. The fineness was 834 to 870.

65 PUP **115 P 14**
John Scott **63°49'N 137°17'W**
Water Licence: YPM89-127 **1989, 1990**

This operation is located on 65 Pup. The valley is very narrow with a steep gradient. Mining occurred on the 1st, 2nd and 5th claims upstream from the downstream property boundary. The average cut depth was 10 feet, with material on the north slope being frozen. Some of the ground had been thawed and stripped previously. The material consisted of 1 foot of black muck, 8 feet of stream gravel and bedrock in various stages of decomposition. All the gravel and a foot or two of bedrock was sluiced.

Mining was done by 4 family members working a 10 hour shift.

A Cat 977 tracked loader with a 3 yard bucket fed the trommel. A Cat 955 tracked loader with 1 yard bucket and a Hough 50 rubber tired loader with 2 yard bucket removed tailings. All three machines were used to strip overburden.

A 10 x 3 foot wet hopper fed material to a 4 foot diameter x 20 foot long trommel. Material smaller than 1 inch passed over a 2 foot wide by 10 foot long sluice run lined with expanded metal, no back matting, expanded metal and backed matting. The processing rate was 25 cubic yards per hour. Clean up was accomplished with a pulsating jig.

In 1989, 3,500 cubic yards sluiced out of three cuts. Tailings and overburden were packed up the side hills. Approximately 1,600 cubic yards were stripped in preparation for 1990. An additional three cuts were mined in 1990 resulting in another 8,500 cubic yards sluiced. Tailings and overburden were packed up the side hills.

Two 4 inch Honda pumps recycled water to the wash plant from an instream reservoir at a rate of 300 igpm. Effluent was treated in two different instream ponds during the season. Water was in short supply and room for settling was scarce until the lower cut was mined out.

The gold was angular, half coarse and half fine. Small amounts of magnetite were found in the concentrate. The fineness was 960.

CLEAR CREEK **115 P 15**
Van Bibber Placer **63°47'N 137°33'W**
Development **1989, 1990**
Water Licence: YPM88-083A

This operation is located on Clear Creek about 2 miles upstream from Barlow Creek. Mining in 1989 took place on the 4th and 6th claims and for 1990 on the 6th, 7th and 8th claims upstream from the downstream property boundary. The ground was frozen in places and averaged 8 to 12 feet deep including 4 to 6 feet of black muck and fines and 4 to 6 feet of coarse gravel with boulders up to 2 feet in diameter. Bedrock was fractured and partially decomposed granite or granodiorite which occurred in troughs and ridges. The gravel and 2 feet of bedrock were sluiced.

Five miners and two helpers worked a 12 hour shift in 1989 with an increase to eight miners and two helpers in 1990.

A Cat D8L bulldozer with U blade and ripper was used for stripping and pushing up pay. A Cat 8H bulldozer with U blade and ripper was used to push pay into the wash plant and to remove tailings.

A 300 Ross Box with a main run and two side runs, each 18 feet long x 4 feet wide lined with hungarian riffles over matting, was used to process the pay. The side runs took material smaller than 1/2 inch. The processing rate was 200 cubic yards per hour. A long tom and gold wheel were used to clean up.

Six cuts were mined in 1989 for a total of 80,000 cubic yards sluiced and 65,000 cubic yards stripped. Eight cuts were mined in 1990 for a total of 160,00 cubic yards sluiced and 80,000 cubic yards stipped. Overburden was pushed up the side hills and tailings were stacked in old cuts and used to build settling ponds.

Water was supplied to the plant at a rate of 2,000 igpm by a 10 x 12 inch Paco pump powered by a 3208 Cat motor. Water was pumped directly out of Clear Creek and effluent treated in a long pond separated from the creek by a berm.

The gold was fine grained and flat. A small amount of magnetite and hematite was found in the concentrate. The fineness averaged 840.

GEM CREEK	**115 P 15**
E. Wiez	**63°57'N136°49'W**
Water Licence: YPM89-170	**1989, 1990**

The operation is located on Gem Creek about 6,000 feet upstream of its confluence with Sprague Creek. Mining proceeded upstream from the 1989 workings. Problems limited the amount of material processed in 1990 and forced the operator to conclude the season early. The ground was not frozen and consisted of 4 feet of black muck and 5 feet of tertiary pay gravels mixed with decomposed granite boulders. Bedrock was decomposed schist and slate. Five feet of old channel gravel and 2 feet of bedrock were sluiced.

A crew of 1 miner and 1 other worked one 14 hour shift.

A Komatsu D60 bulldozer with angle blade was used to strip, break out pay and build ponds. A 2000 Trojan loader with a 3.5 yard bucket was used to feed the box and stack the tailings.

The wash plant consisted of a 7 foot wide x 14 foot long dump box which screened 1/8 inch minus material to an undercurrent side run lined with 2 layers of expanded metal and Nomad matting. The main sluice run processed 4 inch minus material and was 14 feet long x 2 feet wide with riffles and Nomad matting. The processing rate was 30 cubic yards per hour.

Water was pumped out of Gem Creek at a rate of 500 igpm by a 4 inch MTM trash pump, powered by a Lombardini motor. Effluent was treated in two small out-of-stream ponds.

Gold was angular with 90% smaller than 10 mesh and a fineness of 895. Concentrates contained barite, scheelite, fine magnetite and possibly platinum.

HIGHET CREEK	**115 P 16**
Bleiler Placers Ltd	**63°45'N 136°10'W**
Water Licence: YPM89-015	**1989, 1990**

This property is located on Highet Creek at the mouth of Hayden (Dredge) Creek, approximately 3 1/2 miles upstream from its confluence with Minto Creek. Mining continued upstream and downstream of cuts made in 1988. 10 to 25 feet of frozen side hill material was ripped and stripped. The overburden ranged from 7 to 25 feet thick and consisted of interlayers of organic blue and grey mud and fluvial glacial gravels including quartzite boulders up to 3 feet in diameter. The bedrock was quartzite and quartzite schist in the downstream cut and shattered quartzite in the upstream cut. The lower 10 feet of gravel and boulders plus 2 to 3 feet of bedrock were sluiced.

The crew consisted of five miners and one helper. Ten hour shifts were worked with double shifts worked 50% of the time.

A Cat D9L bulldozer and a 637 Scraper with a 20 yard bucket were used for stripping. When sluicing, the bulldozer pushed the pay into a stockpile which was fed to the box by a Hitachi UH20 tracked excavator with a 4 yard bucket. Tailings were removed and stacked in the old cuts by a Cat 988 loader with a 7 yard bucket.

The wash plant is a modified Ross 200 with a hopper and wet grizzly. The sluice box is 40 feet long and 9 feet wide with three top runs and one bottom run. The processing rate is 250 yards per hour. A total of 150,000 yards were sluiced in 1989 and a total of 130,000 yards were sluiced in 1990. Approximately 280,000 cubic yards were stripped.

Water was supplied directly out of the creek to the wash plant at a rate of 2500 igpm by a Morris 8 by 10 inch pump powered by a Cat 3208 engine. An electric powered sump pump kept the cut dry. Low water levels during 1989 and 1990 required partial recirculation of the effluent using the sump pump. Effluent was treated by a 300 by 400 by 30 foot deep settling pond, constructed in the spring of 1988 and located about 1 1/2 miles downstream in the Highet Creek valley.

Ninety five percent of the gold in the upstream cut was smaller than 20 mesh. Twenty percent of the gold in the downstream cut was larger than 4 mesh and larger nuggets were more common. The fineness was 825.

HIGHET CREEK 115 P 16
E. Bleiler 63°46'N 136°11'W
Water Licence: YPM88-088 1989, 1990

This property is located on the right limit of Highet Creek, 1 claim downstream from Morrison Pup. Two cuts were mined in 1989. The first cut was 20 feet wide by 40 feet long by 28 feet deep. The second cut was 180 feet long by 50 feet wide by 43 feet deep. One other cut, measuring 40 feet wide by 200 feet long by 35 feet deep, was mined on the right limit in 1990. Eight feet of old channel gravels and 2 feet of the decomposed schist bedrock were processed. Overburden consisted of slide material, clay, sand and gravel.

One miner worked one 8 hour shift per day.

A Cat D8H bulldozer with a U blade was used for stripping, removing the tailings, pushing big boulders out of the way and feeding the sluice box. A Cat 955K tracked loader, with 1 3/4 yard bucket was used to move equipment. The overburden and tailings were pushed into mined out areas and levelled.

The wash plant consisted of an 8 by 14 foot flat bottom dump box and a single run sluice, 40 feet long and 4 feet wide. The grade on the box was 1 1/2 inches per foot. The sluice was lined with 3 inch angle iron riffles over astroturf and coco matting. Punch plate, with 3/4 inch diameter holes, covered the riffles at intervals to prevent "washing out" by larger material. Approximately 30 yards per hour were processed.

Water acquisition was by a gravity feed pipeline supplied by Highet Creek. Water use averaged 500 igpm. Effluent was treated in an out-of-stream pond measuring 80 x 120 feet x 6 feet deep.

Gold was very fine grained with very few pieces of coarse gold. Fineness averaged .840.

HIGHET CREEK 115 P 16
Frank Erl 63°46'N 136°13'W
Water Licence: YPM89-078 1989, 1990

This property is located along the upper reaches of Highet Creek, 3 claims upstream from the mouth of Rudolph Gulch. The elevation at this location is 3300 feet. The valley bottom is narrow and the stream gradient steep. A number of cuts were made on the right limit bench deposits and one cut was made in the creek channel. Bench deposits consisted of 5 feet of gravel mixed with quartzite and granite boulders overlain by 2 feet of gravel and yellow clay layers and 2 feet of black muck. Bedrock was schist. The creek deposit is in much deeper ground as the bank elevation increases rapidly into the hill side. The ground was not frozen. Five feet to six feet of gravel and one foot of bedrock were sluiced. The stripping to sluicing ratio was 0.3:1.

F. Erl worked one 11 hour shift in 1989, and had a helper for part of the 1990 season.

He used a Cat D82U bulldozer for stripping overburden. A Cat 950 rubber tire loader, with a 2 yard bucket was used to feed the box and remove tailings.

The wash plant consisted of a wet grizzly 4 feet long by 5 feet wide and a single run sluice 20 feet long by 3 feet wide. The spacing of the pipes is 1 inch at the top and 3 inches at the bottom. The sluice box is lined with angle iron riffles spaced 1 1/4 inches apart, expanded metal and coco matting. The processing rate was 30 cubic yards per hour. Approximately 16,000 cubic yards were processed from the bench deposit in 1989 and 1990. Another 3,000 cubic yards were sluiced from the creek in 1990.

Water was supplied to the sluicing plant directly from a small reservoir in Highet Creek by a 1800 foot long 6 inch diameter metal and PVC gravity fed pipeline. This pipeline supplied water to spray bars on the grizzly. Water was in short supply in 1989.

Effluent was treated in two instream ponds measuring 100 by 100 feet and 50 by 40 feet respectively and by two out-of-stream ponds also 50 feet by 40 feet that were cleaned out regularly. A small presettling pond was also cleaned out regularly.

Most of the bench deposit gold is fine grained with an estimated 10% being coarse. The fineness is 840. Some scheelite was found in the concentrates.

HIGHET CREEK 115 P 16
W. Gordon 63°46'N 136°11'W
Water Licence: YPM89-161 1989, 1990

The property is located along Highet Creek at the mouth of Rudolph Gulch. In 1989, work was conducted in Highet Creek approximately three claims downstream from Rudolph Gulch. The only work done in 1990 was to clean out the settling pond.

The stratigraphic section was not frozen.It consisted of 10 to 12 feet of gravel and clay overburden, and 3 to 8 feet of pay gravels mixed with large granite boulders which is decomposed schist bedrock.

Wilf Gordon and his wife Gene operated the mine for an average of 15 to 20 hours a week from June to August.

The principal piece of equipment was a Michigan 35 loader which was used to feed the box and remove the tailings. A Michigan 55 loader and a International TD14 bulldozer were also used occasionally for stripping and tailings removal. Tailings were used to fill in mined-out areas.

The pay gravels were processed in a single run sluice box 20 feet long by 2 feet wide and classified by a dry grizzly and half-round dump box 18 feet long by 8 feet wide. The first 10 feet of the box consisted of punch plate, expanded metal and coco matting. Two sizes of flat riffles, expanded metal, and coco matting line the bottom half of the box. Larger material was pulled by hand through the box. The processing rate was 10 to 20 yards per day.

A diversion dam in Highet Creek directs flow through two pipes. One pipe feeds the sluice box, the other diverts overflow back into the creek. Flow into the pipes is regulated by a plywood gate. Approximately 800 igpm was used. Water shortage can be a problem and the total creek flow is often used.

The gold is fine to medium grained, well travelled with a fineness of 820.

Single sluice box is used at Wilf Gordon's operation on Highet Creek.

JOHNSON CREEK	**115 P 16**
C & I Construction	**63°47'N 136°21'W**
Water Licence: YPM88-016	**1989,1990**

This property is located on Johnson Creek, approximately 1 mile downstream from the mouth of Sabbath Creek. Cuts were mined on claims P2028 & P2031. The average depth of material was 21 feet. The upstream cut was frozen on the north slope. The ground consisted of 6 feet of black muck, 15 feet of stream gravel with boulders up to 2 feet in diameter and decomposed bedrock of variable composition. The gravel and some bedrock were sluiced.

Work was carried out by 2 miners and 1 helper working a 10 hour shift.

A Cat D8H bulldozer with angle blade was used to strip ground and push up pay gravels. A Michigan 275B loader with a 7 cubic yard bucket was used to feed the plant and remove tailings.

A 10 by 20 foot derocker fed material into a single run sluice 3 feet wide by 24 feet long. The sluice was lined with 8 feet of angle iron riffles followed by 16 feet of punch plate over riffles. The processing rate was 50 - 60 cubic yards per hour. Clean up was done with a pan and gold wheel. A crucible and furnace was used to process dory bars.

Approximately 39,000 cubic yards were sluiced and 26,000 cubic yards stripped in 1989 and 1990. Tailings and overburden were stacked on side hills and in the centre of the valley. The cuts were left open to serve as settling ponds.

Water acquisition was via a diversion ditch from Johnson Creek to a small pump pond. A 3 inch Monarch pump powered by a 14 H.P Onan diesel supplied water to the spray bar. An earth berm was used to control water in the diversion ditch. Effluent was treated in 2 shallow out-of-stream ponds that worked adequately when cleaned out on a regular basis.

Gold was flat and well travelled with red coloration. Some black sand and scheelite were also found in the concentrate.

JOHNSON CREEK	**115 P 16**
R. Barchen	**63°47'N 136°22'W**
Water Licence: YPM89-116	**1989, 1990**

This property is located on Johnson Creek, 1 mile downstream from the junction of Sabbath Creek. Mining in 1990 took place on the 6th and 7th claims upstream from the lower property boundary. Ground on the right limit of Johnson Creek was mined. The Johnson Creek channel was not disturbed. Four cuts were mined, each measuring about 200 by 100 feet by 25 feet deep.

The deposit consisted of 14 feet of pay gravel overlain by 11 feet of black muck. Bedrock was decomposed schist which required ripping. It turned to muck when worked. The pay gravel and 2 feet of bedrock were sluiced. All the material was frozen.

The processing rate was 60 cubic yards per hour. One continuous cut was mined in 1990 for a total of 30,000 cubic yards stripped and 50,000 cubic yards sluiced. The cut was filled in with tailings and overburden as mining progressed upstream.

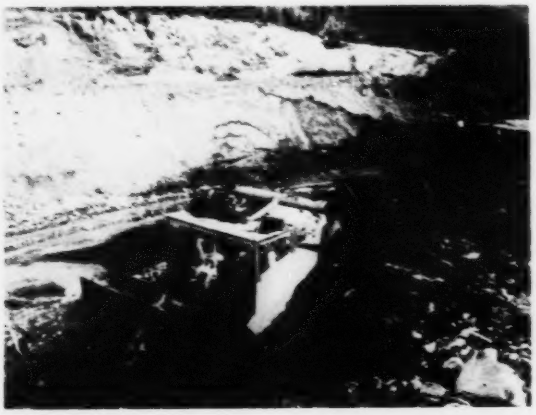
Three miners worked an 11 hour shift. Some 24 hour shifts were worked.

A 275B loader with a 6 1/2 yard bucket was used for feeding the wash plant and removing tailings. The overburden and pay were ripped and pushed with a Cat D8 bulldozer.

The wash plant consisted of a 10 by 17 foot derocker, feeding a single run sluice 16 feet long by 3 feet wide. The sluice was lined with 2 inch flat bar at 2 inch spacing over top of 7 layers of expanded metal and astroturf. The grade on the box was set at 2 1/4 inches to the foot.

Water was taken from Johnson Creek through a short section of 12 inch diameter pipe to the derocker at a rate of 700 igpm. Effluent was treated in a long drain and in one out-of-stream pond.

The gold was uniformly fine grained with a fineness of 780.



Homemade derocker at Johnson Creek mining operation of R. Barchen being fed by a loader.

HUNKER CREEK 116 B 3a
J & C Holdings Ltd. 64°01'N 139°09'W
Water Licence: YPM88-007 1989, 1990

This property is located along the left limit of Hunker Creek approximately 2000 feet downstream from the mouth of Henry Gulch. The operation continued mining into the hillside as in past years. The mining activity in 1990 was restricted to the upstream end of the open cut bank which has been exposed over approximately the last ten years.

The deposit being mined is approximately 90 feet deep. Roughly 80 feet of frozen black muck with intermittent silt layers and ice lenses overlies 8 to 10 feet of pay gravel. Bedrock varies between decomposed gumbo clays to slightly fractured consolidated bedrock. Stripping activity in 1990 has located a bedrock reef which places the pay gravels above the old bedrock level. The reef has helped solve some of the drainage problems which have been encountered at this site. The sluice section consists of all the gravels and up to 2 feet of bedrock. Most of the pay is found in the first foot of gravel above bedrock, because it is difficult to separate all gravels are sluiced. A single cut 80 feet wide by 500 feet long was sluiced in 1990.

This operation was run by the C. Mayes family in 1989 and 1990. There was an average of three workers with some of the stripping work done by outside contract work.

Heavy equipment on the property consisted of one Cat D9H bulldozer which was used to rip and push off the muck overburden, load the sluice box and remove tailings. An hydraulic monitor was used to aid the stripping program in 1989 and to a lesser degree in 1990.

The sluice plant consists of a 24 by 10 foot side feed dump box and a 24 by 4 foot single run sluice. A 4 inch drop has been built into a 6 by 4 foot section of the dump box. The dump box (drop section) uses 1/2 inch angle iron with expanded metal and nomad matting underneath. The first 8 feet of the run uses 1/2 inch punch plate with 1 inch angle iron riffles and nomad matting. The lower 16 feet of the run uses 2 inch angle iron riffles and nomad matting. The processing rate was 100 cubic yards per hour using 2000 - 2500 igpm water, which was pumped to the sluice box by a 12 by 14 inch Peerless pump, powered by a V-8 GMC diesel engine. Water for sluicing and for hydraulic monitoring is pumped from an instream pump pond in Hunker Creek. Effluent is settled in an out-of-stream settling pond. Out flow from the settling pond occurred through a pipe overflow in 1989 and part of 1990. The settling pond has been constructed in old tailings and the overflow was blocked off mid season 1990 so that outflow would occur by seepage through the tailings only.

The gold recovered was described as similar to past years. Very little coarse gold was recovered with the bulk of the gold (90%) between 60 and 100 mesh. Quartz was common on any coarse gold recovered. Fineness was 720.

Hydraulicing at J & C Holding's property on Hunker Creek. Water was used to strip a thick section of black muck.

HUNKER CREEK 116 B 3a
R.L. Somerton 64°02'N 139°10'W
Water Licence: YPM88-112 1989, 1990

This operation is located at the base of the left limit near the mouth of Hunker Creek. Mining is at the base of the hillside and has proceeded into the hill slowly since 1985. As the operation moves into the hillside the total depth to bedrock has increased. A 2 foot layer of moss and vegetation overlies 18 feet of gravel. Fractured, decomposed bedrock was found beneath the gravels. All of the gravels continue to be sluiced as they hold some gold. No bedrock was sluiced.

Les Somerton and his wife Marnie run this operation on a small scale. For part of the 1989 season Les Somerton was helped by other family members.

One cut measuring 40 feet long by 10 feet into the face was stripped and partially sluiced in 1989. Except for a short testing program in 1990 there was no activity at this operation.

Equipment consisted of a John Deere 350 front end loader with backhoe which fed the homemade sluice box, carried tailings away and stripped the pay gravels. Most of the thawing was done naturally.

The sluice plant consisted of a 4 foot wide by 6 foot long dump box built from an old dump truck box. The lower section (2 feet by 3 feet) is lined with nomad matting and 5/8 inch punch plate which captures most of the gold. The washed pay then passes over a grizzly built from steel pipes. The classified pay then passes through a single sluice run 14 inches wide by 20 feet long. Nomad matting, 1 1/2 inch angle iron riffles and 5/8 inch punch plate lines the run. Production varied between 10 and 30 cubic yards per hour were sluiced.

An out-of-stream reservoir (30 by 70 feet by 3 feet deep) captured spring water which was pumped to the sluice plant by a 3 inch Yamaha pump. An estimated 250 igpm was used for sluicing.

The gold recovered was very fine grained, flattened and rough. The fineness ranged from 750 to 820.

HUNKER CREEK **116 B 3a**
(Dago Hill) **64°01'N 139°08'W**
Miben Mining 1976 Ltd. **1989, 1990**
Water Licence: YPM86-158R

This mine is located on Dago Hill, a left limit bench of Hunker Creek immediately downstream of Last Chance Creek. The remainder of a cut on the upstream side of Dago Hill was sluiced in 1989. The operation was moved to the downstream side of Dago Hill in 1990.

The stratigraphic section in the 1989 cuts consists of a thin 1 foot organic layer underlain by 30 feet of partially frozen White Channel gravel. Bedrock usually shows up as a decomposed gumbo clay. The cut that was stripped in 1990 was between 70 and 80 feet of white channel gravel on top of the decomposed bedrock. In the 1989 cut, the lower 15 feet of White Channel gravel were sluiced; no bedrock was sluiced. Since the 1990 cut is being hydraulic monitored, the entire stratigraphic profile is processed through a sluice run. A complete clean up of the sluice run will be done prior to running the high grade pay through the sluice box at the end of the hydraulic stripping.

Mike Stutter and Benny Warmsby worked this operation with another employee in 1989. In 1990 Mr. Stutter and Mr. Warmsby worked by themselves.

Equipment used in 1989 included: a Cat D9 bulldozer for stripping; a Cat D8 bulldozer for sluicing; a Cat D7 bulldozer for tailings; a Cat D6 bulldozer for odd jobs; and a Cat 824 rubber tired dozer and a Cat 992 loader for tailings. In 1990 the stripping was done primarily with a hydraulic monitor but the upper gravels were mechanically stripped off with the D9 bulldozer. The D8 bulldozer was used to push tailings from the end of the tail race over the Hunker Valley rim. The D7 bulldozer was used in the cut to feed the sluice run. The remainder of the equipment either wasn't used or was sold.

Hydraulic mining of White Channel gravels on Dago Hill, Hunker Creek by Miben Mining.

The sluice plant used in 1989 was in a fixed location and pay was transported for sluicing. An estimated 150 cubic yards per hour of pay gravels was sluiced. The pay was classified to minus 5/8 inch in a 6 feet diameter by 40 foot long trommel. The pay then was sluiced in 14 oscillating runs 3 feet wide by various lengths for a total of 500 feet of sluice run. Coco matting and expanded metal line the sluice runs. The effluent is then directed into a sand screw to remove and dewater the fine settleable solids. The oversize rock from the trommel and the fines from the sand screw are carried to a dumping location by a conveyor. The effluent leaves the sand screw and passes through a bedrock drain over the Dago Hill rim to out-of-stream settling facilities in the Hunker Creek valley. The instream pump pond in Hunker Creek is approximately one mile downstream from the settling pond.

The sluice plant used in 1990 was primarily used as a system to move overburden. Gravel from the hydraulic stripping program was pushed into a 30 inch wide by 250 foot long sluice run. The water carried the low grade gravel at little expense and dumped it over the rim. The sluice run was lined with astro turf, angle iron riffles and 5/8 inch punch plate. Prior to sluicing the high grade pay an entire clean up is done and pay is fed to the sluice box on a more controlled rate. The same pump pond was used as in past years and the large out-of-stream settling pond that Preido Mines built was used for effluent treatment.

Water was supplied to the sluice plant and hydraulic monitor by a 14 inch pump powered by an 850 HP Cummings diesel engine. Due to the lift onto Dago Hill an instream settling pond upstream on Hunker Creek was built to provide cleaner water. The same pump pond has been used for years.

The gold was reported to be fine grained, smooth and flat with some quartz attached. Fineness varies between 800 and 850.

HUNKER CREEK **116 B 3a**
Gene Fowler **64°07'N 139°08'W**
Water Licence: YPM89-117 **1990**

Gene Fowler's operation was located on Australian Hill, a right limit white channel bench of Hunker Creek. The first large scale mining of Australian Hill began in 1990. The operation shut down early in the fall because the sluice plant was not able to capture the fine gold.

The mine plan was to begin on the rim and sluice into the hillside. The stratigraphic profile was made up of 100 feet of red, non-paying gravels on top of 60 feet of White Channel gravel. The lower 20 feet of White Channel gravel and 2 feet of bedrock were sluiced. After screening, 90% of the gold was - 40 mesh which stopped the sluicing early due to poor gold recovery. Part of a 20 by 100 feet cut was actually sluiced in 1990.

Gene Fowler employed a crew of six miners to set-up and begin sluicing. Setting up and stripping took until mid-season.

Four Cat D9 bulldozers did the stripping and pushing of pay into the sluice plant. The tailings were carried over the rim and dumped by the sluice run. The sluice plant consisted of three screening decks with a total of six 48 inch wide by 20 foot long sluice runs. Up to 450 cubic yards per hour were sluiced using 3000 igpm of water. The water was pumped up onto Australian Hill by a 3 stage 20 inch Peerless pump powered by a V12 Cat engine. The pump pond was built next to a side channel of the Klondike River. The pump pond is connected to the Klondike River by two large screened culverts.

Effluent was settled in three large out-of-stream settling ponds in the Klondike Valley. Outflow from each of the cells is controlled by water gates. Final outflow is to Hunker Creek.

The gold is extremely fine grained. The sluice plant may be modified to improve the efficiency of fine gold recovery. Fineness is 850.

HUNKER CREEK **116 B 3a**
(AUSTRALIAN HILL) **64°07'N 139°08'W**
Eldorado Mining **1990**
Water Licence: YPM89-100

Mining on Australian Hill began in 1990. Australian Hill is a right limit White Channel bench of Hunker Creek near its mouth.

Aerial view of mining and settling facilities. Australian Hill.

Dave Johnson began on the rim and worked both along and into the hillside. The stratigraphic section is getting deeper as the cuts proceed into the hillside. The ground averaged 90 feet deep in the 1990 cuts. Unfrozen White Channel gravels made up the entire profile. Gold was found in the gravels from top to bottom so they were all sluiced. A single cut 1500 feet along the rim was sluiced in 1990.

Dave Johnson, his two children, and two employees ran a double shift for part of 1990.

Two Cat D8K bulldozers cleared the cuts, fed the sluice plant and pushed tailings over the rim. A Pearson rock box was used. A 14 foot wide by 18 foot long dump box fed into three sluice runs. The center run (3 feet wide by 24 feet long) was lined with nomad matting, expanded metal and 3/4 inch punch plate. Each side run (4 feet wide by 24 feet long) was lined with nomad matting and expanded metal. Production was estimated at 130 cubic yards per hour. The gold is very fine grained (80% - 30 mesh) and this type of sluice box proved to be very poor for fine gold recovery. Water was pumped from an instream pump pond on Hunker Creek to the sluice box with a lift of 285 feet. A hillside drain was built to channel the effluent into the three large (70 acres) out-of-stream settling ponds built by Gene Fowler and Murray Orbanski. Final effluent outflow is back to Hunker Creek.

The gold recovered was very fine grained, 20% less than 10 mesh but larger than 30 mesh, 60% less than 30 mesh but larger than 60 mesh, and 20% less than 60 mesh. Most of the -60 mesh was not recovered except in the bulk test program. Fineness is 860.

HUNKER CREEK 116 B 3a

Peter Gould 64°01'N 139°07W
Water Licence: YPM89-045 1989, 1990

Most of the 1989 and 1990 season was spent mining on Hattie Gulch, a right limit tributary of Hunker Creek. Peter Gould, his sister Susan and his father John ran an operation for a short time in the spring at Nugget Hill but most of each season was spent at Hattie Gulch.

The deposit being mined is part of the large White Channel gravel deposit which forms much of Australian Hill. A shallow 1 foot layer of brown clay overlies an average of 50 feet of unfrozen White Channel gravel. The cuts get progressively deeper as work proceeds into the hillside. Although most of the pay is near bedrock, as much as 20 feet of the lower gravels were sluiced. 1989 was a move and set-up year so only large scale testing was done. Two 200 by 60 foot cuts were mined in 1990.

A Cat D7 bulldozer stripped the waste gravels and pushed pay up for sluicing. A Cat 930 loader fed the sluice plant and carried coarse tailings away. The fine tailings were ramped up with the Cat D7F. The wash plant consisted of a 4 foot diameter trommel (scruber) feeding two vibrating sluice runs 4 feet wide by 20 feet long. The last four feet of the trommel is made of one inch screen. Production was estimated at 30 cubic yards per hour with 1000 igpm required for sluicing. A 6 by 6 inch pump powered by a Cat D318 diesel engine pumped water to the wash plant from an instream recycle pond on Hattie Gulch. Make-up water was pumped to the recycle pond for 6 hours twice a week. Outflow was by ground seepage or evaporation only.

The gold recovered was angular and considerable amounts of quartz was present. As is typical with Australian Hill, much of the gold is fine grained with 25% less than 50 mesh. Fineness is 740.

LAST CHANCE CREEK 116 B 3a

Ian Bremner 64°01'N 139°06'W
Water Licence: YPM87-008RL 1989, 1990

Ian Bremner has been mining a right limit bench of 8 Pup. Eight Pup is a left limit tributary of Last Chance Creek. This operation has been run on a very small scale in 1989 and 1990 due to equipment failure and lack of water for monitoring/sluicing.

A White Channel gravel deposit was being mined. A thin organic layer overlies 40 feet of White Channel gravel. Bedrock is decomposed schist. The entire 40 feet of gravel is monitored and washed in a single run sluice box. Approximately 1 foot of bedrock is sluiced as well. A single cut 80 feet wide by 80 feet long by 40 feet deep was mined in 1989 and finished up in 1990. A Cat 955K Trac loader pushed the washed gravels into the sluice box and occasionally cleared tailings.

The sluice box consists of a single run conventional sluice box 30 inches wide by 50 feet long. The sluice run is lined with coco matting, angle iron riffles and punch plate of assorted sizes. The sluice run was used partially as a method of moving tailings to the rim of the hill for disposal. Water is obtained by capturing spring melt and run-off for sluicing early in the summer or waiting for heavy rains to recharge the pump pond. An old ditch was rehabilitated with grade from the two forks of Last Chance Creek. Due to the poor condition of the water conveyance ditch and unusually hot dry weather very little water was captured from the ditch in either 1989 or 1990. Effluent from sluicing is settled in an instream settling pond on 8 Pup.

The gold recovered tends to be very fine grained and flat with no quartz. An occasional piece of crystalline gold is covered. Fineness is 700.

KLONDIKE RIVER/ 116 B 3a
HUNKER CREEK 64°07'N 139°08'W
M.W. Orbanski Ltd. 1990
Water Licence: YPM89-102

Murray Orbanski moved from the mouth of Bonanza Creek to Australian Hill in 1990. The operation was set up on the Klondike River side of Australian Hill to mine a large bench deposit of White Channel gravel. Murray Orbanski is one of three operators that set up large operations in 1990 on Australian Hill. The mine was shut down early in the fall due to poor gold recovery in the wash plant.

The mine plan was to be similar to Gene Fowler's mine plan. A long rim cut would be sluiced first and then the operation would mine into the hillside. The ground would rapidly deepen as the cuts moved towards the center of Australian Hill. The entire profile was drilled and shown to contain gold however the best pay was found in the lower White Channel gravels. A cut 100 feet wide by 300 feet was mined in 1990. The ground averaged 75 feet deep and the entire profile was made up of sandy gravels.

Murray Orbanski employed eight men during the setting up of his operation which lasted all of the spring and a good part of summmer.

Two Cat 631C scrapers, three Cat D9H bulldozers and a Cat 966D loader were used for setting up and sluicing. The scrapers were mainly used for construction of three large settling ponds. The two Cat D9H bulldozers stripped the cuts to higher pay and helped construct the settling ponds. The Cat 966D loader was used for clean-ups at the wash plant. A Cat hoe was available when needed for hoisting work or settling pond maintenance.

The wash plant consists of an 8 foot diameter by 56 foot long trommel. The minus 1/2 inch classified slurry is split into six 4 foot wide by 30 foot long oscillating sluice runs. The plus 1/2 inch is directed over the rim where it is dumped. The effluent is collected at the ends of the sluice runs and discharged over the rim to a series of three out-of-stream settling ponds approximately 70 to 75 acres in total. Effluent was discharged from cell to cell by water control boxes controlling the depth. Final outflow was to Hunker Creek. To provide water a large pump pond was built next to a side channel of the Klondike River. Two double screened culverts were placed between the river and the pump pond to permit enough inflow. The water was pumped through a 16 inch pipe 1800 feet long up a lift of 300 feet to the sluice plant. A three stage pump powered by a Cat 391 engine was required to pump the 5000 igpm needed for the sluicing plant on Australian Hill. The operator calculated the production to be 500 cubic yards per hour.

The gold that was recovered was extremely fine grained. Murray Orbanski is looking for another method of recovery so that the fine gold recovery is improved. Gold fineness is approximately 850.

KLONDIKE RIVER 116 B 3c
Lee Hall 64°02'N 139°25'W
Water Licence: 1989, 1990
YPM88-091
YPM89-180

Lee Hall's mining operation is located in the Klondike River Valley immediately upstream from Dawson City on right limit bench claims. Pay gravels were excavated from second and third tier bench claims on top of the hillside and transported by dump truck to the sluice plant located on dredge ponds in the valley bottom. Easy viewing access from the highway provided a popular tourist attraction. Washed gravels from the operation were hauled away by local contractors for use in highway and construction projects. Initial testing of this ground was completed in 1988. Full scale production started in 1989 when one Cat D9 dozer was used to dig pay, one Cat 980 loader filled the dump trucks and one Cat 966 loader fed the sluice and removed tailings. The washing plant was an 8 by 16 feet derocker with a double sluice run of 2 by 30 feet each using both expanded metal and standard riffles to process about 50 cubic yards per hour. One mining cut of approximately 300 by 300 was excavated to bedrock in 1989.

In 1990 four Cat D9 bulldozers were used to dig pay and backfill mining cuts. Two Cat 980 front end loaders, two Cat 966 front end loaders and one Case 850 backhoe were used to load dump trucks, feed the sluice, and remove tailings. The sluice plant was a 10 by 12 foot derocker with two oscillating sluice runs 4 feet by 20 feet each with standard riffles over nomad matting. The plant processed about 100 cubic yards per hour. Four mining cuts approximately 100 x 1500 feet each were excavated to bedrock in 1990. Many hours of cat time were used in backfilling mined out areas.

Water was recycled in old dredge ponds with no visible discharge to the Klondike River. Pay gravels averaged from 20 to 30 feet deep under 5 to 15 feet of sandy overburden. All gold was recovered from the bottom 2 or 3 feet of gravel plus up to 3 feet of ripped bedrock.

Gold recovered contained nuggets with quartz attached plus fine and coarse grained gold which assayed between 820 and 850.

KLONDIKE RIVER **116 B 3c**
Bill Olson **64°03'N 139°22'**
Water Licence: **1989, 1990**
YPM87-002
YPM89-093

This operation has been located on the right limit bench of the Klondike River valley downstream from Thomas Gulch since 1982 and has been in full-time operation since 1987. This is a small scale, one man operation using a Cat D7 bulldozer to dig pay gravel and to clean bedrock, a Cat 980C loader to remove overburden and a Cat 950 front end loader to feed the sluice box and remove tailings. The sluice box has a 6 by 14 foot dump box lined with punch plate and a single sluice run (2 by 16 feet) with standard 2 inch angle iron riffles over coco matting. Approximately 30 to 40 cubic yards per hour are processed. Water was collected from Thomas Gulch via an old ditch that has been restored. Water was also recycled from settling ponds on the bench and there is no visible discharge to the Klondike River.

The gravel deposit mined was about 20 feet deep at the rim and increased to about 50 feet deep as mining proceeded back into the hillside. From 4 to 6 feet of vegetation and organic overlay a mixed clay and gravel layer up to 20 feet deep over pay gravels. Gold was recovered from the bottom 6 feet of gravel and 1 or 2 feet of bedrock. Two cuts approximately 150 by 300 feet each were mechanically excavated in 1989 and again in 1990 with the bulldozer and front end loaders.

Recovered gold is mostly fine grained with very few flattened nuggets. The fineness was approximately 800.

KLONDIKE RIVER VALLEY **116 B 3c**
JACKSON HILL **64°02N 139°22W**
White Channel Underground/ **1989, 1990**
American Highland Mining
Water Licence: YPM88-109

This operation was located on the left limit, high level, bench of the Klondike River valley just upstream from Bonanza Creek at Jackson Hill. During the winter of 1989 frozen pay gravel was excavated by underground drilling and blasting. Two Chapman tank drills were used to drill the frozen face for explosive loading. Two Amico 920 scoop trams with 10 cubic yard buckets transported gravels from underground to stockpiles on top of the previously mined bench ground. The White Channel gravel deposit being mined was up to 200 feet deep. The bottom 15 feet of gravel plus 2 or 3 feet of bedrock were stockpiled. During the summer of 1989 this stockpiled material was processed in the wash plant. The plant consisted of a dump box followed by one 40 foot long single run sluice with angle iron riffles followed by a shaker screen which classified materials down to 1/2 inch. The underflow from the screen was then split into 12 parallel sluice runs 4 feet wide by 20 feet long. Approximately 3500 igpm were used to sluice about 100 cubic yards per hour. A 16 by 16 inch Peerless pump, powered by a Cat 3406 diesel, was used to pump water from an old dredge pond in the Klondike valley up onto the bench. One Cat D9 bulldozer was used to push stockpiled pay gravel toward the sluice plant and one Cat 980B front end loader was used to feed gravel into the dump box. Tailings gravel was allowed to spread by gravity over a large tailing fan over the hillside. Wastewater was settled in several large dredge ponds before discharging by seepage back to the Klondike River.

In 1990 the operation sluiced gravels which had been exposed the previous year. No underground mining took place during the winter. One Cat D9 bulldozer was used to push gravel, one Case backhoe/tractor was used to feed the wash plant and one Cat 980 front end loader was used to dispose of tailings. The wash plant was a small trommel (2 feet diameter by 8 feet long) with a single run sluice, 2 feet wide by 40 feet long with both angle iron riffles and expanded metal over nomad matting. A 4 inch electric submersible pump was used to recycle water from a pond on top to the bench; make-up water was supplied from the dredge pond in the valley. Approximately 500 imperial gallons per minute were used to process about 20 yards per hour. Gold was recovered from the bottom ten feet of gravel plus one foot of bedrock. Fineness was 820.

BONANZA CREEK **116 B 3c**
Murray Orbanski **64°02'N 139°23'W**
Water Licence: YPM87-156 **1989, 1990**

This operation was located at the mouth of the Bonanza valley in a wide flat section that had been previously dredged, this operation sluiced for a full season in 1989. However in 1990 they sluiced for part of the season and spent the rest of the time cleaning up and rehabilitating the site prior to moving to a new location.

Three Cat D9 bulldozers and one Cat 966 front end loader were used to excavate and load pay gravels into three 631C rubber tired scrapers, which transported the gravel to the grizzly and hopper, which in turn fed the trommel. The scrapers were also used to haul away tailings gravel loaded from a conveyor at the end of the trommel. Tailings gravel was spread over large areas of old dredge tailing piles. One 245 backhoe was used to clean drains.

M. Orbanski's 8 foot diameter trommel with 12 sluice runs which was located at the mouth of Bonanza Creek right limit.

Water was recycled from old dredge ponds using a 12 by 14 inch Worthington pump powered by a Cat D343 diesel engine which pumped approximately 3500 gallons per minute. The wash plant was an 8 foot diameter trommel, 56 feet long with punch plate the full length combined with twelve sluice runs, four of which were 20 feet long and eight of which were 30 feet long with riffles at the top and expanded metal over nomad matting. From 300 to 350 yards per hour were processed.

The mining cut in 1989 stayed in virgin ground at the base of the hill on the right limit of Bonanza Creek valley and progressed upstream from the 1988 cuts. Bedrock was about 45 feet deep under brown gravels with streaks of coal-grey gravel. The overall dimensions of the mining cut for 1989 were approximately 350 feet wide by 1900 feet long down to bedrock. About one million cubic yards were moved in 1989. In 1990 this operation sluiced for a few weeks near the beginning of the season and then moved to a new location after recontouring tailings piles.

All gold recovered was small flakes and powder with no nuggets. Fineness was 780.

BONANZA CREEK	**116 B 3c**
Clive Nicholson	**64°01'N 139°22'W**
Water Licence: YPM89-007	**1989, 1990**

This operation was located near the mouth of Lovett Gulch, a right limit tributary to Bonanza Creek, and has been run by Robbie Nicholson since 1988. Cal-Denver excavated a large open pit in 1987 which was abandoned and allowed to flood. An 8 by 6 inch pump was used continuously in 1989 to dewater this pit while at the same time water in the pit was being pumped to the sluice plant.

One Cat D9 bulldozer was used to strip overburden and dig pay gravels and one Cat 920 front end loader fed gravel from the stockpile into the sluice plant. The sluice plant had a dry grizzly feeding a single sluice run which was 36 inches wide by 20 feet long with standard riffles followed by a section which was 48 inches wide by 15 feet long with expanded metal over nomad and coco matting. A 6 by 5 inch high pressure pump powered by a 3304 Cat diesel engine delivered about 1000 gallons per minute which was used to process approximately 50 cubic yards per hour.

Pay gravels were excavated from a cut on the bench with a total depth of about 50 feet. Roughly 40 feet of overburden were removed mechanically from on top of about 10 feet of orangy-brown gravel. All 10 feet of gravel plus up to 5 feet of fractured bedrock were processed. In 1989 a section of approximately 300 feet by 50 feet was mined. In 1990 a section of about 300 feet by 75 feet was mined. Tailings gravel was used to backfill the old pit.

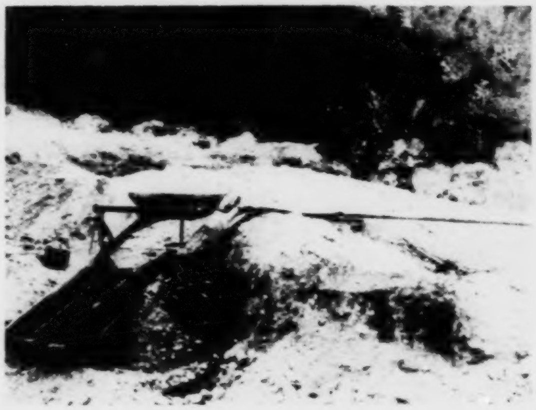
The gold was all less than 60 mesh with a fineness of 797.

BONANZA CREEK	**116 B 3c**
Hans Algotson	**64°01'N 139°22'**
Water Licence: YPM88-089	**1989, 1990**

This two man operation was subcontracted by George Hamilton in 1989 and 1990 and was located on Bonanza Creek at Trail Hill. One Cat D6 bulldozer and one Cat D7 bulldozer were used to dig pay gravel and feed the wash plant and remove tailings. The wash plant was an 8 by 10 foot dump box with punch plate followed by triple sluice runs: one 24 inch wide by 16 foot long center run and two 27 inch wide by 16 foot long side runs with stepped riffles. A 6 by 8 inch pump was set beside an instream reservoir on Bonanza Creek and was used to deliver approximately 1200 gallons per minute which was used to process about 40 to 50 yards per hour. Pay gravels were excavated from old hydraulic tailings fans composed of white channel gravel from the hillside above. All material is loose and thawed and easily moved. In 1989 a cut about 70 by 70 feet by 5 feet deep was mined. In 1990 this was expanded to total dimensions of approximately 100 by 300 feet.

Waste water was discharged to an out-of-stream settling pond where it was then released by seepage only back to Bonanza Creek.

Gold recovered was all fine powder and assayed between 790 and 820.



View of a typical 3 run sluice box, at Hans Algotson operation on Trail Hill.

LITTLE GOLD CREEK 116 C 2
Gordon Downs 64°02'N 140°46'W
Water Licence: YPM89-047 1989, 1990

This small-scale, two man operation was located on Little Gold Creek a few claims upstream from its confluence with Big Gold Creek on previously mined ground. One Cat D4 bulldozer was used to push stockpiled gravel from old sluice ramps left over from prior operations. One Case 580C backhoe was used to feed the sluice plant.

The sluice plant had a 3 by 4 foot dump with a 3 by 2 foot screen to minus 1 inch followed by a single sluice run 24 inches wide by 10 feet long with two feet of angle iron riffles at the top end and then expanded metal over nomad matting. Water was supplied at a rate of about 500 gallons per minute or less by a 3 inch Briggs and Stratton gasoline powered pump. From 10 to 15 cubic yards per hour were processed.

Water was pumped from a small reservoir in Little Gold Creek and waste water was settled in two, out-of-stream ponds prior to discharge back into Little Gold Creek by seepage only.

Gold recovered was fine grained with a few small nuggets and some quartz attached.

GLACIER CREEK 116 C 2
Fell Hawk Mining 64°02'N 140°49'W
Water Licence: YPM89-139 1989, 1990

This four man operation was located on Glacier Creek about 2 miles upstream from its confluence with the valley of Big Gold Creek. Mining was carried out in the valley bottom and on the left limit, low level bench.

Two Cat D8L bulldozers and one Cat D9H dozer were used to dig and push pay gravel and one 966 front end loader with 4 cubic yard bucket was used to feed the sluice box and to remove tailings. The sluice box consisted of a derocker with spray bars and a single run sluice 5 feet wide by 20 feet long. An 8 by 10 inch pump supplied approximately 2000 igpm which processed about 100 cubic yards per hour.

The stratigraphic section in the valley bottom was up to 30 feet deep with layers of gravel, sand and black muck intermixed. The bottom 4 feet of gravel plus 1 foot of bedrock were sluiced.

Water was pumped from an instream recycle pond on Glacier Creek. Waste water was cleaned in two out-of-stream settling ponds prior to recycle.

Gold recovered was mostly fine grained with about 5% small nuggets and coarse gold.

GLACIER CREEK 116 C 2
Daniel & Peggy Cuevas 64°02'N 140°45'W
Water Licence: YPM86-157L 1989, 1990

This operation was located on the left limit of the Glacier Creek Valley immediatley upstream from its confluence with the valley of Big Gold Creek, next to Steve Prohaszka's operation.

During the 1989 season up to seven miners were employed working two shifts; in 1990 four miners worked one 10 hour shift, seven days a week.

Three Cat D8H bulldozers were used to dig and push gravels and one Cat 966 front end loader with a four yard bucket was used to remove tailings. In 1990 one Cat D9G was also used to dig pay gravel and one Cat D8H fed the wash plant.

The wash plant was a modified Hector box, a 15 by 20 foot dump box with 1/2 inch and 3/4 inch punch plate over expanded metal and nomad matting dispersing to a triple run sluice as follows: center run is 36 inches wide by 20 feet long with 2 1/2 inch angle iron riffles in stepped 4 foot sections; two side runs are 36 inches wide by 20 feet long with alternating 5 foot sections of expanded metal over nomad matting and then 3 inch angle iron riffles. Approximately 3000 gallons per minute of water was provided by a 10 by 12 inch Worthington pump powered by a 3208 Cat diesel engine. From 75 to 100 cubic yards per hour were sluiced.

The stratigraphic section deepened to 100 feet as the mining cut progressed back into the left limit hillside. Only 2 feet of organic overburden overlay a deep layer of mixed, frozen sand and gravel and clay layers. The bottom 3 feet of gravel plus 5 feet of decomposed bedrock were processed. Waste gravels were pushed and stockpiled mechanically. In 1989 approximately 150,000 cubic yards of waste overburden was stripped and about 67,000 cubic yards of pay gravels were sluiced. Mining cuts completed in 1990 had surface measurements of approximately 150 by 250 feet and 300 by 300 feet.

Water was pumped from Big Gold Creek and was settled in old mining cuts on Glacier Creek downstream on Greg Hakonson's ground.

Gold recovered was angular and coarse with some quartz attached. Size distribution was roughly 10% + 10 mesh, 65% - 10 + 60 mesh and 25% - 60 mesh. Fineness was 840 plus.

BIG GOLD CREEK **116 C 2**
Steve Prohaszka **64°02'N 140°45'W**
Water Licence: **1989, 1990**
YPM87-003
YPM89-164

In 1989 and 1990 this two man operation was located at the base of the hillside at the confluence of the Big Gold Creek Valley and the Glacier Creek Valley. Two Cat bulldozers, a D8 and a D9, were used to dig and push pay gravels. Two Cat front end loaders, a 980 and a 988, were used to feed the wash plant and remove and stack tailings.

The wash plant was a 6 foot diameter trommel, 24 feet long with double sluice runs, each 30 inches wide by 24 feet long with alternating 2 foot sections of angle iron riffles and 2 foot sections of expanded metal riffles. An electric powered, 6 inch submersible pump delivered approximately 1500 igpm which was used to process about 120 yards per hour.

The stratigraphic section was a very thin layer (only one or two feet maximum) of black muck over a very deep gravel layer which varied from 30 feet up to 80 feet deep. The bottom 5 or 6 feet of gravel plus 3 feet of bedrock were processed. The mining cut in 1989 was about 30 feet wide by 300 feet long. The mining cut in 1990 was about 200 by 100 feet total.

Water was pumped from a small instream reservoir on Big Gold Creek. Wastewater was discharged to out-of-stream settling ponds before releasing it into Glacier Creek.

Gold recovered was fine grained with no nuggets. The fineness varied between 820 to 840.

SIXTY MILE RIVER **116 C 2**
Richard Daem **64°02'N 140°33'W**
Water Licence: YPM89-076 **1989, 1990**

This was a small, two man operation located on the first tier, left limit bench of the Sixty Mile River Valley immediately upstream from its confluence with Twelve Mile Creek. One Cat D8 bulldozer was used to dig and push gravel and one Cat 966 front end loader was used to feed the wash plant. The wash plant had a 6 by 12 foot dump box with a 5 by 5 foot screen deck to minus 3/8 inch. A single sluice run with angle iron riffles 18 inches wide by 6 feet long was followed by triple sluice runs 24 inches wide each by 6 feet long each with expanded metal over nomad matting. A 6 by 6 inch Gorman Rupp pump, powered by a 4 cyclinder Ford diesel provided about 500 igpm which was used to process up to 20 yards per hour.

The stratigraphic section was only 6 feet deep on the bench with 3 feet of waste overburden and 3 feet of gravel. Bedrock was tested to a depth of 5 feet but gold was recovered from the bottom of the gravel layer only.

Three small mining cuts were completed in 1990 with surface dimensions of approximately 20 by 100 feet and 80 by 200 feet and 100 by 30 feet each. Water was pumped from the Sixty Mile River and wastewater was settled in out-of-stream ponds with seepage discharge only.

Gold was flattened with a few small nuggets and fineness was 830.

SIXTY MILE RIVER **116 C 2**
Eldorado Placers **64°01'N 140°43'W**
Water Licence: YPM89-092 **1989, 1990**

Greg Hakonson ran a 14 man operation in 1989 and reduced to a 9 man operation in 1990. The operation was located in the wide, Sixty Mile River Valley both above and below its confluence with Big Gold Creek.

Two D8H Cat bulldozers were used to feed the sluicing plant, two D9H and two D9L Cat bulldozers were used for stripping overburden and for digging and pushing gravel.

In 1989 two sluice boxes were being used at separate locations, both consisting of a 20 by 20 foot dump box leading to an 8 by 12 foot separator followed by a triple run sluice with a 36 inch wide by 24 foot long center run lined with punch plate and angle iron riffles and two 6 by 20 foot side runs with expanded metal riffles. Two 10 by 12 inch pumps provided up to 5000 igpm which was used to process about 225 cubic yards per hour. In 1990 one wash plant was used. The "super sluice" consisted of a large classification and washing unit followed by a double sluice run 6 feet wide by 20 feet long each with both angle iron riffles and expanded metal over nomad matting. This "super sluice" used

5000 gallons per minute to process 225 yards per hour.

The stratigraphic section in the valley bottom averaged 2 to 4 feet of black muck overburden on top of 8 to 10 feet of gravel. Bedrock was fragmented and decomposed with clay in some places and quartz boulders in others. The bottom 3 feet of gravel plus 3 feet of bedrock were sluiced.

Water was ditched from the Sixty Mile River to the operations located upstream of Big Gold Creek. Waters from both Big Gold Creek and Glacier Creek were settled in old mining cuts in the Sixty Mile Valley and were re-used and re-settled at the operations downstream from Big Gold Creek.

The pay streak is very wide in the Sixty Mile River Valley. In 1989 ten mining cuts were excavated, each with surface dimensions approximately 300 by 300 feet. In 1990 eight mining cuts were completed, each approximately 300 by 300 feet.

Waste water has been cleaned in large out-of-stream settling ponds prior to discharge back into the Sixty Mile River.

Gold recovered has been flattened fines with galena and sulphides but very little quartz. Gold is both bright yellow and dark brown with fineness around 820.

MOOSE CREEK **116 C 2**
Ron McMillan **64°12'N 140°54'W**
Water Licence: YPM89-006 **1989, 1990**

This two person operation was located on Moose Creek, a tributary to the Forty Mile River, close to the Alaska Border. The ground was tested and stripped in 1989 and mining began in 1990. A Cat D6 bulldozer was used to dig and push gravel and a backhoe was used to feed pay gravel into the wash plant. The wash plant was a dump box lined with punch plate and a single run sluice, 36 inches wide by 40 feet long with 3 inch angle iron riffles. Water from a ditch was supplied to the wash plant by gravity pipeline. About 15 cubic yards per hour were processed through the sluice.

Up 3 feet of black muck overburden was stripped mechanically from on top of a gravel layer about 10 to 12 feet deep. The bottom 6 feet of gravel plus 1 foot of bedrock were sluiced from a mining cut approximately 100 by 100 feet.

Water supply was ditched about 600 feet and waste water was settled in a long narrow series of out-of-stream ponds. Tailings gravel was used to build up the berm beside the creek channel.

MOOSE CREEK **116 C 2**
Robert Young **64°11'N 140°54'W**
Water Licence: YPM90-026 **1989, 1990**

This two person operation was located on Moose Creek about 2 1/2 miles downstream from the bottom of the access road in from the Top of the World Highway. The ground was tested and prepared in 1989 and mining began in 1990. One Cat D9 bulldozer was used to dig and push gravel and one Cat 988 front end loader was used to feed pay gravel into the wash plant and remove tailings. The wash plant was a 7 by 20 foot dump box and single run sluice, 45 inches wide by 32 feet long with angle iron riffles. An 8 by 10 inch pump powered by a Cat diesel engine supplied approximately 5000 igpm which was used to process from 80 to 100 cubic yards per hour.

Gravel was excavated from a deposit about 10 feet deep which had been previously stripped of overburden. All gravel plus up to 4 feet of bedrock were sluiced. Tailings were used to build berms along the creek bypass channel. Water was settled in four large out-of-stream settling ponds and an instream recycle pond.

Gold recovered was coarse and flattened with a few nuggets with quartz attached. Fineness was 840.

BROWNS CREEK **116 C 2**
Walter Largent **64°11'N 140°46'W**
Water Licence: YPM87-149 **1989**

This two person operation was located on Browns Creek, a right limit tributary of the Forty Mile River, near the upper fork. Mining was carried out in 1988 and 1989 but did not operate in 1990. One Cat D8H bulldozer was used to dig and push gravel. One front end loader with a 4 yard bucket was used to feed the wash plant and one front end loader with a 3 yard bucket was used to remove tailings.

The wash plant consisted of a grizzly/hopper with conveyor belt feed to a shaker screen and a single run sluice 4 feet wide by 22 feet long. A diesel generator provided electrical power for the conveyor, the shaker and a 6 by 6 inch water pump. Gravel was taken rim to rim on the narrow valley bottom from a mining cut approximately 150 feet wide by 450 feet long. Stripped overburden was from 4 to 6 feet deep and gravels averaged from 8 to 10 feet deep. The bottom 4 feet of gravel plus 1 foot of bedrock were sluiced.

Water was pumped from a small, out-of-stream reservoir and waste water was settled in two out-of-stream ponds. A creek bypass channel was maintained with gravel berms.

Gold recovered was mostly fine grained from 14 to 20 mesh with a few small nuggets with no quartz attached. Fineness was around 800.

BROWNS CREEK 116 C 2
Bernard Gagnon 64°13'N 140°49'W
Water Licence: YPM86-122 1989, 1990

This three person operation was located about half way down Browns Creek. One Cat D8H bulldozer was used to dig and push gravel and one Cat 966 front end loader with a 3 1/2 yard bucket fed pay gravel into the wash plant and removed tailings. The wash plant consisted of a V-box hopper with minus 1/4 inch shaker screen feeding to a cyclone concentrator with underflow discharging through a single run sluice, 18 inches wide by 24 feet long, with 2 inch angle iron riffles. Twelve yards per hour were processed using 500 gallons per minute or less from a 4 by 5 inch pump powered by diesel.

Gravels excavated from the valley bottom were about 8 feet deep. On the low level, right hand bench the gravel was about 6 to 8 feet deep under 2 or 3 feet of overburden. All gravels plus about 2 feet of bedrock were sluiced. About 1500 cubic yards were mined from the valley bottom and about 1500 cubic yards from the low level bench in 1989.

Water was pumped from an instream reservoir and settled in an out-of-stream pond. A short creek diversion channel was built around the mining area.

Gold recovered was mostly fine grained but some gold was coarse and chunky with a few small nuggets.

BRUIN CREEK 116 C 2
Daniel Lee 64°14'N 140°41'W
Water Licence: YPM89-162 1989, 1990

This two person operation was located on Bruin Creek, a right limit tributary of the Forty Mile River, about 2 miles upstream from the middle fork of Bruin Creek. Two Cat bulldozers, a D8 and a D6, were used to dig and push gravels, and one Cat 950 front end loader was used to feed the wash plant and to remove tailings. The wash plant was a hopper with shaker screen and single sluice run 30 inches wide by 24 feet long with angle iron riffles. A 3 by 4 inch electric pump provided about 500 gallons per minute which was used to sluice about 50 cubic yards per hour.

The mining cut was located near the center of a wide part of the valley bottom in ground which had been previously stripped. Gravel was only about 4 feet deep. All gravel plus about 6 inches of bedrock were sluiced from a mining cut approximately 60 feet wide by 400 feet long. Water was pumped from an instream reservoir and settled in three out-of-stream ponds.

Gold recovered was mostly fine gold with a fineness of approximately 800.

SIXTY MILE RIVER 116 C 2b
Chuck MacDougall 64°00'N 140°45'W
Water Licence: YPM89-148 1989, 1990

Chuck and Linda MacDougall continued to mine the left limit of the Sixty Mile River valley approximately half way between Miller Creek and Big Gold Creek near the same location they have mined since early in the eighties. Water monitors were used to melt and strip frozen overburden which varied from 15 to 40 feet deep. Mechanical stripping of overburden and pay gravels was accomplished using one Cat D8H bulldozer. The gravel layer varied from 4 to 8 feet deep. The wash plant was a dump box and single run sluice. Water was recycled from large out-of-stream settling ponds using an 8 by 8 inch pump. Make-up water was pumped from a small pond on the ditch from the Sixty Mile River.

MILLER CREEK 116 C 2c
Sixty Mile Enterprises 64°01'N 140°53'W
Water Licence: YPM89-186 1989, 1990

This five man operation was located along the high level, left limit bench of Miller Creek at several sites from about two to five miles upstream from the mouth of Miller Creek, a left limit tributary of the Sixty Mile River. Two support staff were employed in camp.

Two Cat bulldozers, a D9 and a D8L, were used to dig pay and push tailings gravels. Two front end loaders, a Cat 980C and a Cat 966C, were used to feed the wash plant and clean settling ponds.

The wash plant was a medium size trommel (4 feet diameter by 20 feet long) with undersize going to double side sluice runs with expanded metal riffles and oversize going to a single run with angle iron riffles. Discharge water from the side runs was fed by gravity to the single sluice. Approximately 65 yards per hour were processed.

Gravels averaged 20 feet deep and black muck overburden varied from a few feet up to 20 feet deep. The bottom six feet of gravel plus 2 feet of bedrock were sluiced. Cuts averaged from 30 to 40 feet deep and were generally 30 feet wide by 400 to 600 feet long.

Water was pumped from an instream recycle pond in Miller Creek using an 8 by 10 inch pump. Several out-of-stream settling ponds were constructed on the bench.

Gold was very coarse with nuggets and quartz and had a fineness of approximately 850.

Sixty Mile Enterprise's trommel with double side runs, located on Miller Creek.

FORTY MILE RIVER **116 C 7**
Forty Mile Placers **64°23'N 140°38'W**
Water Licence: YPM89-033 **1989, 1990**

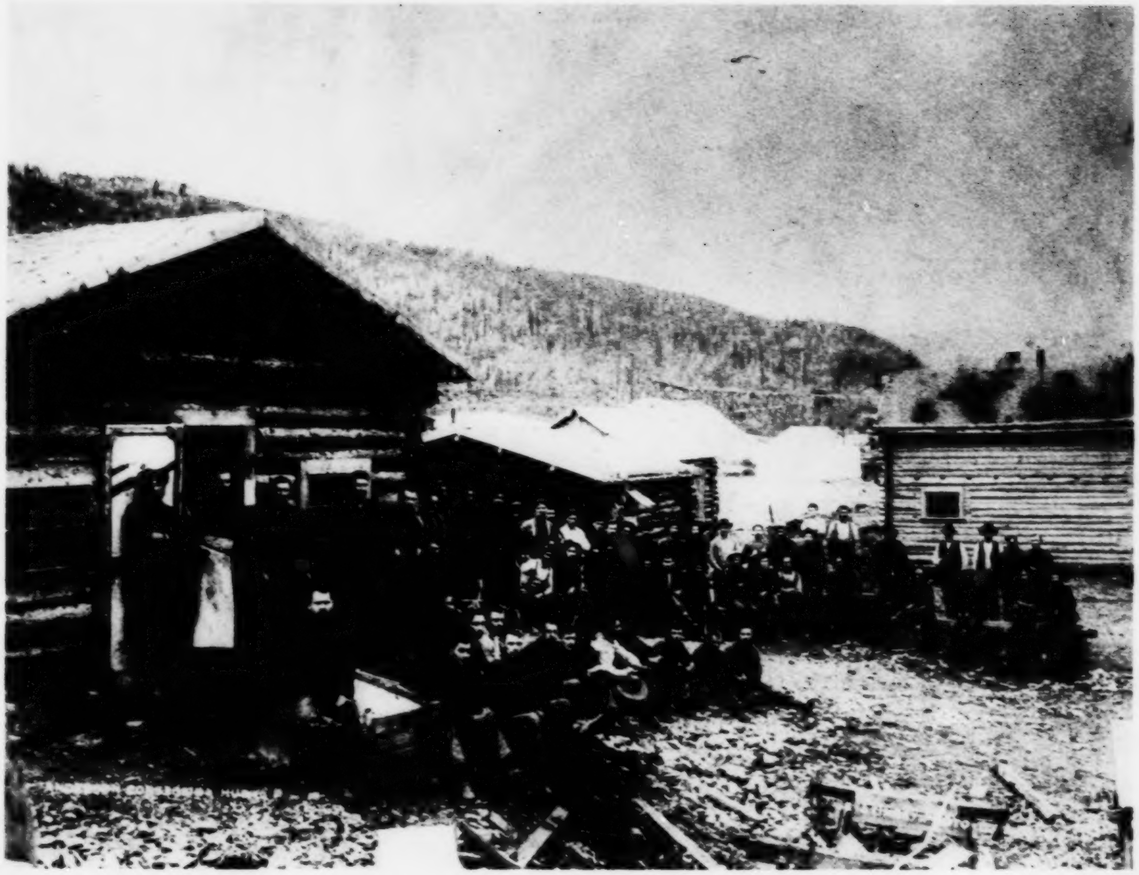
During 1989 and 1990 this three person operation was located on a left bank gravel bar that was exposed at low water. A Cat D6C bulldozer and a Cat 920 loader with a 1 3/4 yard bucket was used to construct a protection berm along the stream ward edge of the gravel bar to prevent flooding of the mine site and entrapment of fish fry. A Cat 213 backhoe with a 3/4 yard bucket was used to dig a pond in the gravel bar in which the wash plant was floated. The backhoe fed the excavated gravels directly into the floating wash plant and a conveyor piled the tailings gravel at the back end of the pond as the wash plant was winched forward.

The wash plant, which was mounted on a floating barge, consisted of a 4 foot diameter trommel with 3/16 inch screen deck and two 4 by 8 feet sluice runs. Water was recycled within the mining pit using a submersible 4 inch electric pump. Approximately 500 igpm were used to process about 80 cubic yards per hour.

The gravel bar averaged about 12 feet deep to bedrock and all of the gravel plus one foot of bedrock were processed through the sluice from a section of gravel bar about 100 feet wide by 1200 feet long. Tailings gravel piles were flattened and recontoured to the same slope as the original gravel bar. Water was recycled and there was no discharge to the Forty Mile River.

Gold recovered was very fine grained (50% minus 100 mesh) with few small flakes but no nuggets and had a fineness of 845.

Forty Mile Placers floating trommel and sluice plant in a recycle pond, located on a gravel bar on the Forty Mile River.

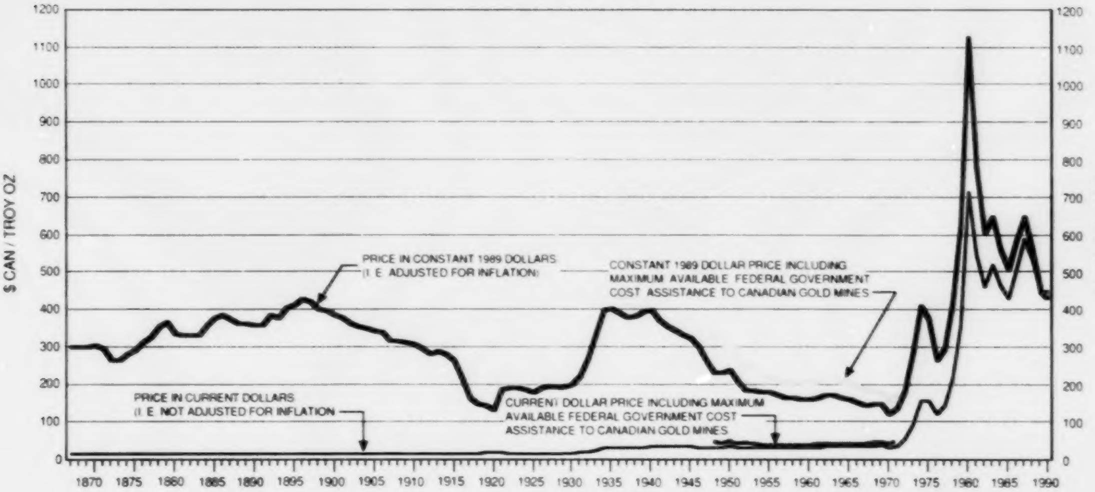


Anderson Consession Hunker Creek
Circa 1900

Is the Gold Price of Today "Good as Gold"?

by Donald Cranstone

AVERAGE ANNUAL CANADIAN DOLLAR GOLD PRICES, 1867 TO 1990



For at least 6500 years, gold has been treasured for its beauty and rarity. The enormous amount of labour put into gold production since prehistoric times has yielded cumulative world production of gold of only some 130 000 tonnes. This may seem like a lot of gold, but it amounts to a cube of pure gold only 62 feet (18.9 metres) on each side. A relatively small percentage of this gold has been lost to humankind over the years in shipwrecks, long forgotten gold hoards, abrasion wear of coins and jewelry, dental gold, unrecovered gold plating and the like. We still have nearly all the gold ever produced.

Almost 75% of the world's cumulative gold output has been produced during the first 90 years of the 20th century. At current world rates of production, the world's stock of already-mined gold is increasing at about 1.6% each year.

Some 7% of the world's cumulative gold production has come from Canadian mines and placer deposits. Canada's gold production, which amounted to 159.5 tonnes in 1989 accounted for almost 8% of total world gold production in that year. The preliminary estimate of Canadian gold output for 1990 is 165.0 tonnes. Only in 1940 (165.2 tonnes) and 1941 (166.3 tonnes) did Canadian gold production exceed this amount.

With the price of gold fixed by the U.S. government at $ U.S. 35.00 a troy ounce from 1934 until the late 1960s, Canadian gold output declined, after 1941, slowly at first until about 1960, and then more rapidly as ore reserves at existing mines (mostly discovered between 1900 and 1937) were depleted and few new gold mines came into production to replace them. Canadian gold output bottomed at only 50.6 tonnes of gold in 1980.

Once the U.S. Government allowed world market demand to set the price of gold, the price began to rise. It peaked briefly on January 21 1980, at $ Cdn. 994 an ounce, equivalent to $ Cdn. 1624 in 1990 dollars, or almost four times the price at the end of February 1991. The price of gold remained high through most of the 1980s, but dropped by almost one-third in 1988 and 1989. This decline seriously affected the production economics of many of the gold mines and other gold deposits that had been discovered during the gold exploration boom of the 1980s. It also made exploration for new gold deposits a much less attractive venture than it had been throughout the 1980s.

During 1990, gold averaged $ Cdn. 450 a troy ounce down from $ Cdn. 592 an ounce in 1987. In the first two months of 1991, the gold price averaged $ Cdn. 434 an ounce. The gold prices reached in the past three years seem low relative to the prices in most of the 1980s. However, it is interesting to look at price from a longer-term perspective.

Although Canada was apparently not officially on the gold standard, the value of the Canadian dollar was held from 1867 (and before) at a level relative to the British Pound and U.S. dollar (which were both on the gold standard) that maintained the gold price at $ Cdn. 20.67 a troy ounce with the exception of the periods 1918 to 1923 and 1931 to 1933. After the U.S. government raised the price to $ U.S. 35.00 an ounce in January 1934, the annual average Canadian dollar gold price remained within the range $ Cdn. 34.99 to $ Cdn. 35.10 an ounce from 1935 until the start of World War II.

During that war, the Canadian dollar was fixed at $ U.S. 1.00 = $ Cdn. 1.10, so the gold price in Canada was effectively fixed at $ Cdn. $ 38.50 an ounce. In 1946 gold averaged $ Cdn. 36.75 and in 1947 $ Cdn. 35.00 an ounce. By 1947, inflation in Canada had reduced the purchasing power of the Canadian dollar to only about 70% of its 1939 equivalent. Looked at another way, the price of gold was the same $ Cdn. 35.00, but production costs had risen by roughly 40%. As a result, gold mining communities were threatened with mine closures. The Emergency Gold Mining Assistance Act (EGMA), which came into effect on June 15, 1948, was designed primarily to assist high-cost or marginal gold mines to continue in operation so that such mines could continue to maintain their dependent communities. The maximum assistance payable in 1948 amounted to $ Cdn. 16.00 an ounce, though some profitable mines were not eligible for assistance. In that year, the assistance, actually paid for eligible production amounted to an average of $3.30 an ounce. Over the 24 year period (1948-1971) that EGMA assistance was paid, the maximum available assistance ranged from $ Cdn. 8.22 to $ Cdn. 16.00 an ounce, remaining at $ Cdn. 10.27 an ounce for the last 14 years, but few mines received the maximum.

All the gold prices discussed so far are expressed in the actual dollars of the year (ie in "current dollars"), but to compare situations from year to year, adjustments must be made for the effects of inflation, with each year's average gold price converted to "real" or "constant" dollars.

The graph depicts changing Canadian dollar gold prices (with and without maximum EGMA assistance) in current dollars and also in 1989 (constant) dollars, over the period 1867 to 1990. Complete analysis of the implications of these prices for Canadian gold mining would also have to take into account changing production costs, considering not only inflation but also changes in labour costs, technology and differing characteristics of gold deposits being mined. Such an analysis is beyond the scope of this article.

The most significant conclusion to be drawn from the price graph is that although the average price of gold during 1990 ($ Cdn. 450 a troy ounce) is below the annual average prices of gold during the period 1979 to 1989, the 1990 average was still significantly higher than in any year since 1867 (and probably well before then), and significantly higher than it was during all of Canada's previous periods of vigorous gold exploration, gold discovery and gold production.

SELECTED EXCERPTS FROM PROSPECTING FOR ALLUVIAL GOLD

BY

C. DOUCH, T. JURY

Permission to reproduce this publication was obtained through the kind cooperation of Colin Douch, Tony Jury and the Ministry of Commerce, Government of New Zealand.

This publication has been included because of it's interesting articles and its description of how to undertake a careful and thorough prospecting programme.

THE GEOLOGY AND CHARACTERISTICS OF WEST COAST NEW ZEALAND ALLUVIAL GOLD DEPOSITS

In planning and undertaking a prospecting programme it is important to understand, in general terms, how the deposits containing the gold were formed. This is necessary, not only to select sample sites with the greatest change of locating payable gravels, but also to ensure that the most suitable sampling methods are used and an optimum number of samples is taken during prospecting, thereby balancing costs with the amount of information required and obtained.

FORMATION OF THE DEPOSITS

The gold-bearing gravels of the West Coast (of New Zealand) were formed during alternating glacial (cold) and interglacial (warm) periods during the past 200,000 to 500,000 years. During cold periods, glaciers grew and advanced westward from the Southern Alps, bringing with them large quantities of stone eroded from the basement rocks, which contained small quantities of gold. Gravel deposits built up in the west where rivers draining the glaciers were unable to transport this rock to the sea faster than it was being supplied by the glaciers. As temperatures warmed, the glaciers began to melt and recede. The rivers were able to cut down into older gravel deposits, assisted by steady uplift of the Westland area. With continued melting of the glaciers, gravel supply was further reduced and sea level rose, until river downcutting stopped or was severely reduced.

At the onset of a new glacial period, the sea level lowered as ice caps and glaciers formed, and gravel supply increased to start the cycle again. During these cycles several different deposit types were formed; buried river channels, fluvial deposits (sand and gravel deposits laid down by rivers), meltwater channels in glacial moraine complexes, and degraded terraces.

On the West Coast these cycles are represented by six main moraines and associated outwash terraces, preserved in the main valleys. It is these terraces and recent river deposits that were worked for gold last century and earlier this century, and are of interest to alluvial goldminers today.

SOURCE OF GOLD

The source of gold in the West Coast alluvial deposits has not been well investigated. It is generally accepted, however, that basement rocks of the Greenland Group, Tuhua Group, Alpine Schists and Torlesse Group underwent extensive erosion some two million years ago, resulting in the formation of the Old Man Group gravels. Small quantities of gold, originally from the basement rocks, were incorporated into the Old Man Group gravels, which, together with the basement, were eroded even further during the younger glacial and interglacial episodes. This cyclic erosion, and deposition and re-deposition by rivers has concentrated the gold into the younger gravel deposits.

GENERAL CHARACTERISTICS

The simplified geological processes presented above, together with the physical properties of gold, give rise to a set of general features that apply to many of the alluvial gold deposits of the West Coast. These characteristics, summarised below, are of importance both in prospecting for, and mining alluvial gold deposits (West Coast Regional Development Committee, 1984).

DISTRIBUTION OF ALLUVIAL GOLD DEPOSITS

The main alluvial gold deposits of the West Coast and simplified geology of the region are shown in Fig. 1. The deposits occur near and west of the old moraine fronts in the vicinity of the golden Mile or Golden Belt of the old timers. To the east of this area morainic and poorly sorted deposits predominate, and are normally insufficiently reworked to contain economic concentrations of gold. Generally, gold size and grades decreased westwards within this belt (although there are many local exceptions). This is a result of the inability of the glacier-fed rivers to transport gold far owing to its high density, equivalent to 19.3 times that of water.

THICKNESS AND GRADES

The thickness of the deposits is variable, ranging from less than 0.3m to 35-40m. Of particular interest to present-day type operations are areas where there is a maximum of some 8 to 9m of gravels below the water table, allowing for mining by hydraulic excavator.

Grades, like thicknesses, are extremely variable, typically ranging from 85 to 500 milligrams per cubic metre of gravel [65 mg=1 grain, 20 grains= 1 pennyweight (dwt), 480 grains = 1 troy ounce].

GOLD DISTRIBUTION

Vertical The occurrence of high grade bottom values is well known in West Coast alluvial gold deposits. Light minerals and small stones are generally washed away by river action leaving larger stones and heavy

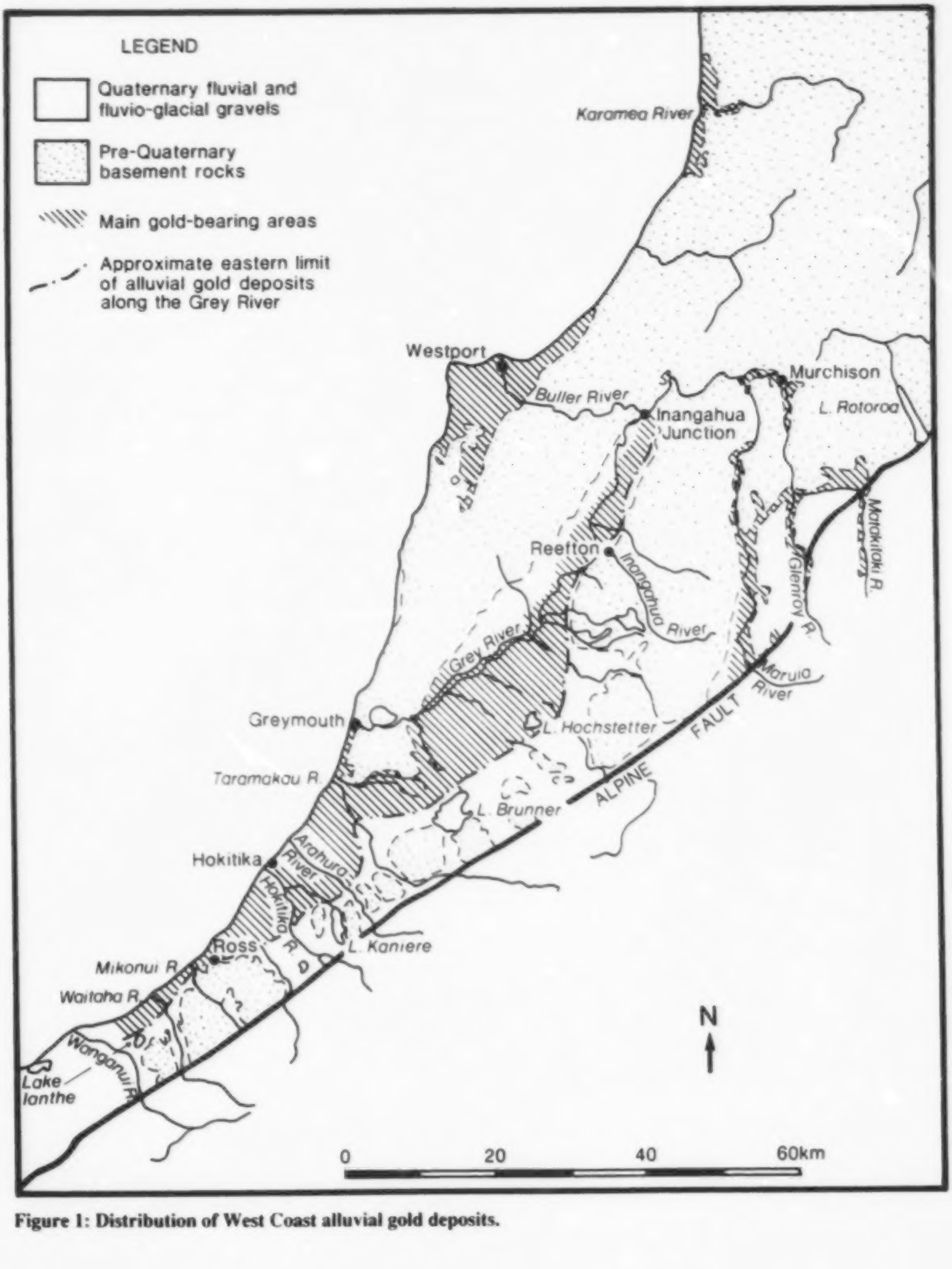

LEGEND
Quaternary fluvial and fluvio-glacial gravels
Pre-Quaternary basement rocks
Main gold-bearing areas
Approximate eastern limit of alluvial gold deposits along the Grey River
Karamea River
Westport
Murchison
Buller River
Inangahua Junction
L. Rotoroa
Reefton
Inangahua River
Matakitaki R.
Glenroy R.
Grey River
Maruia River
Greymouth
L. Hochstetter
ALPINE FAULT
Taramakau R.
L. Brunner
Hokitika
Arahura River
Hokitika R.
Ross
L. Kaniere
Mikonui R.
Waitaha R.
Wanganui R.
Lake Ianthe
N
0
20
40
60km

Figure 1: Distribution of West Coast alluvial gold deposits.

minerals including gold. The highest grades are commonly found in the bottom metre or two meters of the gravel which is known as bottom-wash. Because several cycles of gravel deposition may have occurred, the complete sequence may contain several clay, or other fine sediment, layers known as false bottoms which were commonly misinterpreted by the old-timers as the true bottom. Rich bottom-wash may be present above each false bottom.

Aggradational gravel deposits overlying the bottom-wash are less well-sorted and are generally of lower grade than the bottom gravels, commonly by a factor of 10 to 20 times.

Some enrichment in gold grade is commonly present at or on the surface, because of natural river or creek degradation, reworking of gold tailings in creek beds, or recent erosion of older gold-bearing gravels.

Horizontal As well as varying in gold content vertically, the host gravels commonly vary in gold content horizontally or laterally as a response to several factors. These include:
a) Distance from the source of the gold - as the distance increases, gold values generally decrease and the gold becomes finer.
b) Changes in river or stream gradient - where the riverbed or stream gradient becomes less steep, gold is deposited in the channel.
c) Secondary enrichment from tributary streams.
d) Changes in position of the river or creek channel with time.

GRAVEL SIZE DISTRIBUTION

The gold-bearing gravel deposits are quite variable in both boulder size and degree of sorting. Boulders up to 1m or more in diameter are not uncommon, but most deposits contain boulders typically 0.2-0.5m in diameter in a sandy to silty matrix. The deposits are generally poorly sorted, and in some places contain extensive silt or sand bands (false bottoms), and buried logs.

CHARACTERISTICS OF GOLD

West Coast alluvial gold is most commonly in the size range of 100 microns (0.1mm) to 2mm or coarser depending on locality (Minehan,1985). Nuggets in excess of one ounce are relatively rare. The largest nugget ever found, the Honourable Roddy, weighed only 99 ounces. The gold is generally flaky or disc-shaped, commonly with thickened rims, although finer particles (<75 microns) tend to be elongated or rod-shaped. Folded flakes due to hammering by boulders in the river system are not uncommon.

The flattened particles have a relatively large surface area for their weight, which can hinder gold recovery by gravity methods.

Most West Coast alluvial gold has a purity of some 94-96% (fineness=940-960), which is relatively high by world standards. The main impurities are silver and copper.

UNDERTAKING A BULK SAMPLING PROGRAMME

Bulk sampling is the most cost-effective means of prospecting alluvial gold deposits, where the gravel bottom is within reach of a hydraulic excavator and sufficient water is available on site. Initial count sampling should be undertaken by pitting or boring, with follow-up sampling by trenching, pitting or boring.

PITTING

SITE PREPARATION

The amount of site preparation required will vary from site to site, depending on factors such as access, water availability and ground conditions. Where tracking or timber removal is necessary this should be undertaken progressively during prospecting as proposed pit locations may have to be altered depending on results obtained. During site preparation be sensitive to the environment. Do not remove or damage trees unnecessarily.

A water supply has to be located and pump established, preferably in a location that will require a minimum of shifting during operations.

Once pit sites are selected, topsoil and overburden should be removed and should be stacked separately for respreading overburden thicknesses and type should be recorded on the pit log. Sufficient area adjoining the pit must be left for the test plant, excavator and for oversize and undersize tailings to be stacked during excavation. This could involve an area of some 20 x 20 m.

In some situations it will be desirable to excavate a small hole alongside the test screen to allow tailings to accumulate after screening. If possible, screen undersize can be channelled into this hole. Where necessary, water for screening may have to be recirculated in order to meet water quality conditions or because of poor water supply. In these cases a small settling recirculation pond will be required and water from the screen should flow back to the pond which would be located at a topographic low point.

The pit and screen should be located so that the excavator can dig the pit and feed the screen and tail out without shifting. This will substantially speed up prospecting operations and save costs. A diagrammatic layout of a pit sampling site is shown in Fig. 2.

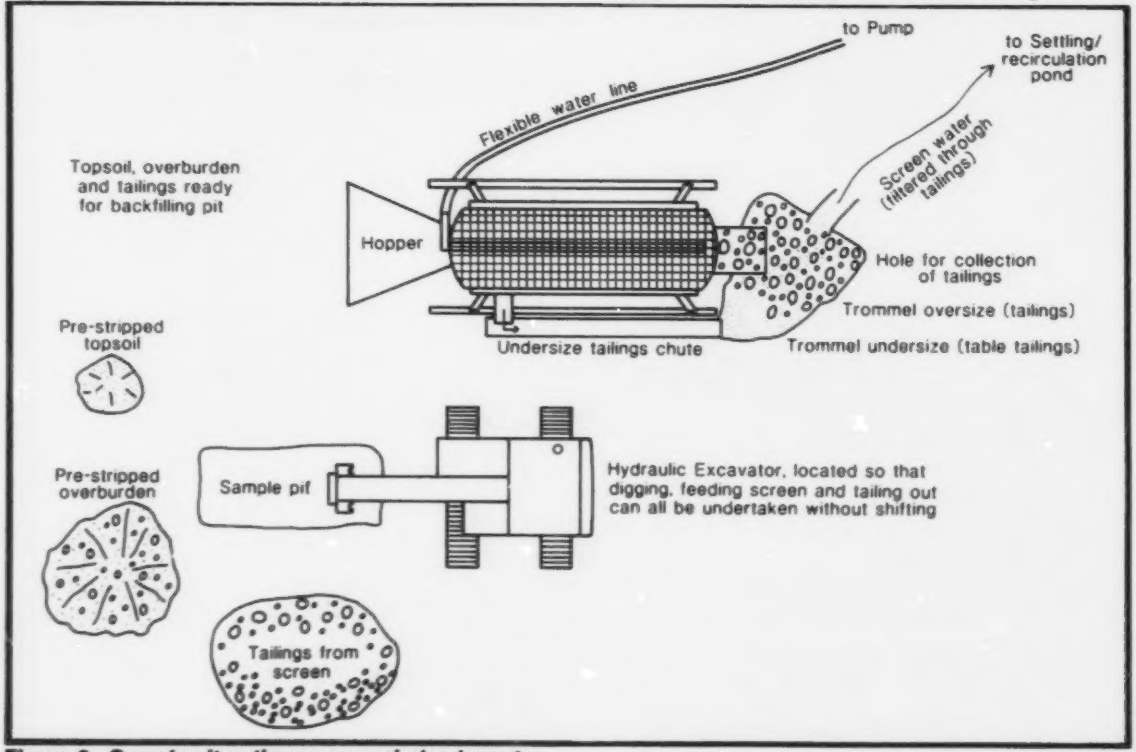

to Pump
to Settling/ recirculation pond
Flexible water line
Screen water (filtered through tailings)
Topsoil, overburden and tailings ready for backfilling pit
Hopper
Hole for collection of tailings
Trommel oversize (tailings)
Undersize tailings chute
Trommel undersize (table tailings)
Pre-stripped topsoil
Pre-stripped overburden
Sample pit
Hydraulic Excavator, located so that digging, feeding screen and tailing out can all be undertaken without shifting
Tailings from screen

Figure 2: Sample pit optimum ground plan layout.

PIT SHAPE

All prospecting pits should have a uniform size and shape with depth. This is relatively easy to achieve when the ground is stable, digging depths are not too great and operations are above the water table. A rectangular pit is easiest to dig. Uniformly shaped pits ensure that the same amount of material is taken from each depth interval and avoids either overvaluing or undervaluing the ground. If it is necessary to ramp down or remove material from the front of the pit to reach bottom, the extra material should be discarded. Spillage into the pit should be avoided as far as possible and, if significant, spilt material should also be discarded.

Where pit walls are unstable, usually in recent river gravels and tailings or where water level is high, slumping of walls may make it impossible to dig a regular shaped pit or even to reach bottom. In this situation, the representativeness of the sample can be increased by taking a larger sample which will contain proportionately less slumped material, and quantities of bottom and upper wash more closely in proportion to that occurring in the deposit. The reasons for this are shown in Fig.3. If slumping problems are severe it may be necessary to attempt to dewater the pit by pumping. This will help pit stability by reducing waves caused by the excavator bucket and arm. It will also reduce the selective washing of fine material, including gold, from the pit walls into the pit, enable the pit to be more accurately logged and allow visual inspection to ensure that the bottom is properly cleaned up.

All pit logs should include accurate measurement of the pit dimensions, so that the bank volume can be calculated.

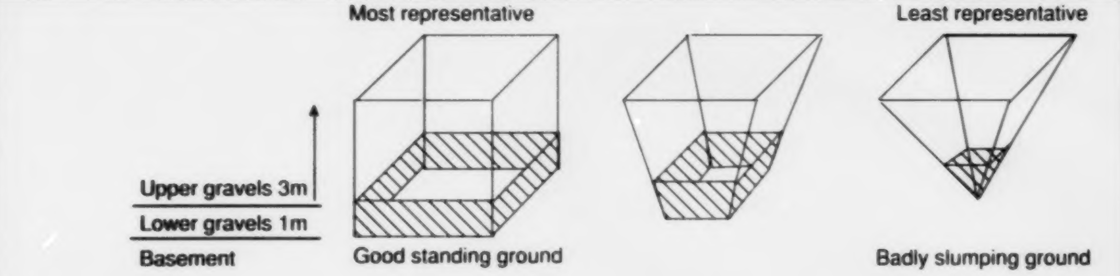
SAMPLE VOLUME

As discussed previously, sample volumes should be in the range of 20-100m^3, depending on ground conditions. Readily transportable test screens, suitable for scout pitting, will typically treat 5-30m^3/hour depending upon size and ground conditions, resulting in individual pits taking between one-half and one day to complete.

There are two methods of measuring the volume of a pit sample: the bank volume and the loose volume.

BANK VOLUME

The bank volume is the volume of pit excavated. For example, a pit 5.0m deep by 4.0m long by 1.0m wide would have a bank volume of 20m^3(5.0x4.0x1.0).



Pit volume (m^3)	64	35.5	21.3
Volume of upper gravels (m^3)	48	30.2	21.0
Volume of lower gravels (m^3)	16	5.3	0.3
Ratio upper:lower	3:1	5.7:1	70:1
Assumed grade (mg/m^3)			
— upper gravels	50	50	50
— lower gravels	500	500	500
Weight average for pit (mg/m^3)	163	117	56

Note: all pits have surface area of 4m x 4m and depth of 4m.
The greater the taper on pit walls the lower the apparent grade.

Figure 3: Effect of pit shape on sample volume and calculated gold grade.

LOOSE VOLUME

The loose volume is the volume of material excavated as measured in a container, usually an excavator bucket of known volume. Hence when measured by counting buckets of a known volume, a bank volume of 20m^3 may correspond to a loose volume of, say 26m^3, due to bulking of the material caused by loosening during excavation.

Both bank and loose volumes should be recorded by accurately measuring the pit to determine the bank volume and by accurately counting the number of buckets of gravel treated (a clicker counter is useful for doing this). For ore reserve calculations and economic analyses it is important that the type of volume being used is specified. Reserves are normally calculated using bank volume. Grades from testing, however, are usually expressed as grains per cubic yard (or milligrams per cubic metre). The cubic yard (or metre) is usually derived by bucket counting, ie., loose cubic metres.

Assuming a swell factor of approximately 30%, the use of loose cubic metres would increase the mineable volume and calculated throughput by 30% relative to bank cubic metres. It would also decrease the apparent feed grade by 30% relative to bank cubic metres. These factors would adversely affect the economics of an operation which had been planned on the basis of bank cubic metre throughputs.

GOLD RECOVERY

Most gold mining operations on the West Coast (New Zealand) have received gold using riffled tables and most bulk testing has been undertaken using similar methods. This testing system has the advantage of duplicating relatively closely, the actual mining operation. Grades determined by careful prospecting using this type of plan should closely approximate recovery grade achieved during later mining. From the practical viewpoint this is quite acceptable, particularly if existing mining plan with riffled tables, is going to be used to work the ground.

The disadvantage of using only riffled tables to recover gold during prospecting is primarily because of their inefficiency at recovering gold in the finer size ranges, less than 0.4mm (Fricker, 1980,1984). If there is sufficient fine gold present, these losses could be significant and may go undetected. Furthermore, if grades are high, there is a tendency to overlook this gold and not attempt to add gold recovery systems to catch it.

A good compromise is to bulk sample using a riffle tables test plant and conduct a tailings sampling programme as a part of the testing to identify whether test plan losses are likely to be significant. If the tailings sampling reveals significant losses, especially fine gold losses, additional or alternative plan, perhaps utilizing jigs, centrifugal concentrators, or spirals, should be obtained to complete the recovery. If losses are negligible, a carefully monitored riffle table plant should be adequate for testing, particularly if regular tailings testing is carried out.

Gold losses, apart from those from the riffle table or gold recovery circuit, can also occur due to inadequate cleaning up of the bottom. If digging underwater, a flat lipped bucket should be used to clean soft bottom and a toothed bucket used to rip a rock bottom. Further losses can occur due to incomplete washing of the gravels in the trommel and collection of gold in traps in the plant itself. Care should be taken to check and avoid these, and also to ensure that no excess water is tipped from the excavator bucket into the plan causing scouring of the riffle table or gold recovery circuit. Valves should be present on the test screen to divert water from the tables during any halts in operation.

TAILINGS SAMPLING

Tailings sampling has been mentioned briefly above and is necessary to ensure that test plant losses are kept to an acceptable level. Continuous sampling is generally impractical, and the usual procedure is to collect a series of small samples at regular intervals from the discharge of the tables or gold recovery circuit and aggregate these to obtain some 20-40 litres (more if possible) of fines. These samples should include fines settled out from the wash water. Samples should not be taken from the fines heap as re-sorting of any gold present occurs here due to water flow, and results obtained are likely to be misleading.

The volume of tailings sample should be measured and then the sample should be treated by Wilfley table, Knudson bowl or similar equipment to determine an approximate tailings grade. From this grade losses can be evaluated.

GOLD SIZE ANALYSIS

Gold samples obtained from the bulk testing and tailings evaluation should be retained for size analysis if required. This can be useful information in selecting the most appropriate equipment gold recovery, particularly if a new plant is proposed for mining.

RESTORATION

Restoration of pit sites should be undertaken as soon as possible after completion of the pit and will be a requirement of the licence.

Where possible, mixed find and coarse material should be put back into the hole and pressed down with the excavator bucket during filling, to reduce bulking. Overburden previously stockpiled should be respread over the levelled pit surface and topsoil replaced over this. Turf mats or other vegetation which has been removed, should be replaced last. If necessary, working areas around the pit sites should be relevelled, fertilized and oversown, or planted in vegetation consistent with adjacent areas.

Sites restored in this manner are acceptable over land such as pakihi or in exotic forestry areas. In the case of pasture land, topdressing and re-sowing should be undertaken to restore the land to its former productivity. Exact requirements will vary from site to site, and advice should be obtained from the Inspector of Mines.

PRACTICAL CONSIDERATIONS

Many practical considerations have been discussed already and these should be noted, in addition to the following points.

Plant selection for bulk sampling is important. Utilizing the most efficient plant will significantly reduce prospecting costs. Where possible, light excavators should be used in wet ground, and machines should be large enough to reach bottom without being too heavy. Excavators with long dipper arms and relatively small buckets should be used by preference.

The size of the test screen will determine throughputs achievable. In general, throughputs below about 10m^3/hour will result in excessive costs in relation to pit numbers, owing to the high number of machine hours required to treat the samples. Screens with throughputs in excess of some 30-40m^3/hr are generally difficult to shift and require considerable water, resulting in higher shifting and water supply costs. In most instances, screens treating 10-30m^3/hr are relatively cost effective.

Water requirements for test screens will vary depending on their size, but will generally be between 10 and 28 litres/sec(135-380gal/min), which can usually be supplied from a 50-100mm pump, providing the total head is not too high.

Wherever possible, prospecting operations should be completed during relatively dry weather to avoid excessive disturbance to the ground surface.

An outline of the information to record during pitting is given in Appendix 2 (placer sample, field record form).

In addition to all of the above, the licence conditions must be complied with, and attempts made to minimize disturbance to the land wherever possible.

TRENCHING

Trenching is generally undertaken in a similar manner and with similar equipment to pitting, and most of the matters discussed above for pitting apply.

Site preparation Site preparation should be similar to that undertaken for pitting operations. Topsoil and overburden should be removed and stockpiled separately from above the trench and the work area. This will generally mean a strip of approximately 10-15m width is disturbed. The overburden and soil should be stockpiled in separate stacks alongside the trench for re-spreading as outlined in the previous section. The area on which the screen will sit should be levelled as carefully as possible to help with screen shifting.

Trench dimensions As with pits, trench dimension will depend on the thickness of gravel and the stability of the ground. It is desirable to leave narrow walls 1-2m wide, every 20-30m, enabling the trench to be bankfilled with tailings, as the work progresses. Screen water can also be discharged into these sections of trench.

Practical considerations During a trenching operation it is important to achieve a good throughput, probably in the order of 30m^3/hr or more. The screen used should be easily shifted, and levelled to minimize shifting time, and a water by-pass valve should be fitted to the screen, as for pitting. By preference, a screen that discharges fines to one side only should be utilized to keep the working width to a minimum. In some cases a swinging stacker to convey screen oversize directly into the trench can be of assistance.

Normally two machines are required for trenching: an excavator for sampling, and a wheel loader or backhoe for tailing out. This results in extra costs for this type of operation compared with pitting. Trenches should be started at the lowest point to aid drainage of water from the trenches. Trenches should be logged with information recorded on a log sheet as for pit samples.

Uniform trench sections should be used wherever practicable, with wash-ups from the sample plant every 20-30m. This is of assistance for reserve calculations. As with pits, trench dimensions should be measured and buckets counted so that bank and loose volumes treated can be determined. Trench measurements should be made as soon as possible after excavation to avoid the effects of slumping of the walls.

Restoration of trenches should be carried out in exactly the same manner as for pits.

UNDERTAKING A DRILLING PROGRAMME

Drilling of alluvial deposits has conventionally been undertaken using cable tool or churn drills. This system is used where ground is too deep for a hydraulic excavator, or other restrictions prevent bulk sampling. The method is relatively slow and costly, but provides reliable results when undertaken carefully. Other methods such as reverse circulation rotary drilling are quicker and cheaper. There is, however, considerable difficulty in interpreting sample results.

For any drilling programme it is generally necessary to employ a drilling contractor. Several quotes should be obtained for the drilling on both an hourly and metre rate. Present (1988) rates in New Zealand would range from $70-100/hour or $170-200/metre depending on the particular job. A written contract should be entered into, detailing the responsibilities of both parties. The main items to be covered should be:

a) Defining a start-up date.
b) Mobilization and demobilization costs (if any).
c) Rate per metre or per hour (metre rates are best when the area is well known because the system discourages delay).
d) The diameter of the drill shoe and pipes to be used.
e) Specification of the types of joints (where possible threaded joints should be used).
f) Payment for time spent pulling casing (this should be included in the metre rate).
g) Circumstances under which stand-by time will be paid.
h) Who is responsible for sample collection.
i) Payment for lost casing (usually the licencee's responsibility).
j) Liabilities of each party.

The drillers should be required to complete daily log sheets for signing and should keep a field log of work carried out, the material drilled, water level, and so on.

Provision of suitable site access is normally the responsibility of the licencee or prospector.

REVERSE CIRCULATION DRILLING

Reverse circulation percussion or rotary drilling is a relatively quick means of obtaining depth or thickness information and gives an estimate of values present. In both systems, double-walled casing is commonly used and compressed air pumped down the opening between the casing walls to the drill shoe. The air lifts the material inside the casing to the surface continuously during drilling and this is collected, usually via a cyclone.

Using these drill rigs, some 60-100m/day can be drilled, with present (1988) hire rates in the order of $1,000-$1,500 per day in New Zealand.

The volume of sample recovered using these small diameter drills is small and volumes can be uncertain. These make accurate grade determination difficult. Such drills are best suited to scout prospecting where depth information is most important.

CABLE TOOL (CHURN) DRILLING

Cable tool drilling involves the driving of a steel casing through the gravel to basement. This is generally done in 0.5-2m drive lengths. At the end of each drive a sand pump is lowered into the casing to bail out the sample, generally 0.2-0.3m at a time. Once the casing is emptied out, with the exception of the bottom 0.1-0.2m, the casing is driven ahead another 05.-2.0m and the process repeated. If large boulders or exceptionally tight ground is encountered, a chisel is used to break up the material to assist driving the casing, and bailing. Chiselling ahead of the drill shoe should be avoided because, if softer ground is penetrated it may cave and volume measurements will be unreliable.

Material recovered from the hole is collected, the volume measured in a measuring bucket, and the sample processed to recover the gold present. Average penetration rates vary from 2 to 8m per day using this system.

SITE PREPARATION

Site preparation for drilling generally requires the formation of a track suitable for either a two or four-wheel drive truck of 15-30 tonnes weight. If necessary, rigs can be winched onto drill sites. A stable footing is required for the rig to ensure that casings can be pulled, and that the rig does not shift during drilling.

METHODS OF CALCULATING VALUES

Drillhole values can be calculated by several different methods, all of which will give slightly different results. The main methods used are; government valuation, theoretical valuation, Radford Factor and progressive averages. The main difference between the systems is the method of volume measurement. Details of the different systems are given in Appendix 5. In general, the best system to use is the progressive averages system, applying a correction factor to the gold weight obtained for intervals where the measured volume of material recovered is greater than the theoretical volume. These sections are effectively down-graded to ensure that a conservative value is derived. Self explanatory metric drill log forms may be used for progressive averages and field logs, and are obtainable from the Minerals Geologist, Ministry of Energy, New Zealand.

INTERPRETING ALLUVIAL DRILL LOGS

Interpretation of alluvial drill logs can be quite complicated and should be undertaken by a suitably experienced person to ensure that the results of individual holes are accurate. In some cases, grades can be recalculated to different depths, or corrections applied to obtain more realistic values.

Groups of holes should be examined for consistency in valuation methods and to identify trends within deposits. The small sample volumes mean that individual drillholes are rarely representative of the deposit at any particular point. This is often borne out by differing values obtained in check boxes, and, in many cases, averaging and geo-statistical methods are required to obtain the most reliable information. This is only possible where there are statistically valid numbers of drillholes, (i.e. thirty or more).

CALCULATION OF RESERVES

Reserve calculations require an assessment of the prospecting data to determine the grade and overall volume of gravel in the deposit and the level of confidence with which this is known. The calculations should exclude any areas which are unmineable (e.g., active rivers, stands of bush, buffer strips, roads, etc.) although rivers can be diverted under appropriate water rights and bush can be felled. At this stage, reserves should be recalculated with different cut-off grades and the affects of different cost structures, such as the use of different machinery types. The optimum combination of cut-off grade and costs will normally be selected. The effect of changing gold prices will also be important and should be applied to the calculation above to test for cost sensitivity.

Once the mineable area has been selected there are several ways of calculating the reserves present. The most common of these are described below.

WEIGHTED AVERAGES METHOD

The weighted averages system can be applied to grade and depth data to derive an overall estimate of the grade of the deposit. Using this system, the grade of each sample is multiplied by the thickness of the ground at that point, and the sum of the grades times the thickness is divided by the total thickness of all samples:

.i.e, $\dfrac{\text{grade i x thickness i}}{\text{thickness total}}$

where = sum of all
i = individual sample (e.g., borehole or pit).

The volume is calculated by determining the mineable area, usually by scaling from a plan, multiplied by the average depth, to give the volume in bank cubic metres.

This system is the simplest means of calculating an overall volume and grade for a deposit. The results will be least reliable where sample density is low or erratic, and most reliable close spaced grid sampling has been undertaken.

CROSS-SECTION METHOD

In this system, prospecting data is used to construct cross-sections of the deposit, usually along the cross-sections (grid lines). The cross-sectional area of the deposit is determined by scaling from the cross-section.

The volume for this interval is determined by multiplying by half the distance between the two adjoining grid lines. This process is repeated for each grid line and the volumes thus derived added up to determine the total volume of the deposit in bank cubic metres.

The weighted average grade of the holes, pit or trench samples on each grid line is calculated and this weighted average is applied to the respective sectional volume, as determined above. The sectional volumes and their average grades are then weighted by volume as follows:

$$\frac{\text{Volume i x weighted average grade i}}{\text{Total volume}}$$

where i = sum of all individual cross section to determine the weighted average grade for the deposit.

This method is probably slightly more accurate than the weighted averages method.

POLYGONAL METHOD

This method is not used as commonly as either the weighted averages or the cross-sectional method, which are both better suited to long narrow deposits. This system ascribes each data point (for example pit or drillhole) an area of influence extending midway to the next adjoining point in every direction. The resultant polygons are then ascribed the thickness and grade of the data point. The area of each polygon is calculated and multiplied by the thickness to derive a volume for each polygon. To determine the average grade, the individual pit or drillhole grades are multiplied by the volume of the appropriate polygon and the results are summed and divided by the total volume to obtain weighted (by volume) average grade.

If desired, the average depth can be ascertained by weighting the pit or drillhole depths according to the polygon area, summing them and then dividing by the total area.

TRIANGULAR METHOD

The triangular method of reserves calculation is a refinement on the polygonal method. In this method lines are drawn between adjacent pits and drillholes to form a network of triangles. Each triangle is ascribed a depth and grade, equivalent to the average of the values of the three pits or holes which form the corners of the triangle. The area of each triangle is then calculated.

To determine the average grade, the grades ascribed to each triangle are weighted according to the volume of each triangle, summed and then divided by the total volume in the deposit. The average thickness is determined by weighting the calculated triangle thicknesses by the appropriate triangle area and dividing by the total area of the deposit.

This method, like the polygonal method, is used relatively rarely in determining reserves for alluvial gold deposits but like the polygonal system, is particularly useful where samples points are irregularly located.

LEVELS OF CONFIDENCE

All reserve estimates are only as good as the quality and quantity of data used to calculate the reserves. Where either the quality or the quantity of the data is low, the level of confidence in the reserves estimate is similarly low and any decision to mine, relatively risky. Where the quality and quantity of the data is high, reserve estimates can be made with greater relative certainty and decisions to mine taken with lower risk.

The level of confidence that can be placed on a reserve estimate is difficult to quantify. Three categories of ore are recognized by the Australasian Institute of Mining and Metallurgy.

Proven ore reserves are those in which the ore has been blocked out in three dimensions by excavation or drilling, but in addition include minor extensions beyond actual openings and drillholes, where the geological factors that limit the ore body are definitely known and where the chance of failure of the ore to reach these limits is so remote as not to be a factor in the practical planning of mine operations.

Probable ore reserves cover extensions near at hand to proven ore, where the conditions are such that ore will probably be found, but where the extent and limiting conditions cannot be so precisely defined as for proven ore. Probable ore reserves may also include ore that has been cut by drillholes too widely spaced to assure continuity.

Possible ore (not reserves) is that for which quantitative estimates are based largely on broad knowledge of the geologic character of the deposit and for which there are few samples or measurements. The estimates are based on an assumed continuity or repetition of which there is geologic evidence; this evidence may include comparison with deposits of similar type.

A recent report (June, 1988) from a joint committee of the Australasian Institute of Mining and Metallurgy, and the Australian Mining Industry Council has recommended a review of this classification. It proposed that identified mineral resources should be subdivided into categories of **inferred, indicated** and **measured,** and ore reserves should be subdivided into categories of **probable** and **proved.** It further recommends that the term **possible** be discarded.

In general, this proposed change will have little effect on report of alluvial ore reserves except that **possible ore** will be called **inferred resource.** At the stage when ore reserves are reported to the Ministry of Energy to accompany a mining licence application, reserves are generally at the **probable** or **prove ore** level of confidence.

These categories provide a useful guide to the level of confidence that can be attached to any estimates according to the reliability and quantity of data used to make the estimate. Proven ore reserves should be established prior to mining, thereby minimising the financial risk of failure. Ministry of Energy (New Zealand) requirements for processing of any subsequent mining licence application are that:

a) At the proposed rate of processing there should be at least one year's supply of proven ore available.
b) The remainder of the area should have been defined to at least the probable level of confidence.

GRAVITY GOLD RECOVERY SYSTEMS

In order to efficiently test the gold grade of gravels from pits or trenches it is necessary to pass a few tonnes of gravel through a prospecting recovery system. Because at this stage only small quantities of material are being handled it is necessary to ensure that all the gold in the ground is recovered. Historically, alluvial miners have recovered particles of gold by the use of riffles in either sluice boxes or riffled tables. There is considerable evidence indicating that this method of gold recovery is inefficient, particularly when gold particle size is below 150 micrometres (0.15mm). Recent test work carried out by the Department of Scientific and Industrial Research (Muir and Fricker, 1986) on gold recovery from working alluvial gold plants, suggests that gold grades ranging from 33 to 134mg/m^3(0.4 to 1.6 grains/yd^3) are being lost in tailings from the operating plants. In general the losses consist of gold in the finer size fractions. The losses are economically significant and may represent the difference between a successful gold mining operation and financial failure.

Several options exist to improve overall alluvial gold recoveries. These involve the use of more sophisticated gravity concentration devices that have immediate application in improved gold recovery. They include jigs, spirals, Knudson bowls, Knelson concentrators, hydraulic riffles and slimes concentrators. By using these other methods of concentration, either in conjunction with the standard riffle tables, or separately, substantially improved gold recoveries can be achieved.

Before addressing the problem of deciding on the most cost effective gold recovery system, it is necessary to obtain some basic background data on the nature of the wash and gold present by thoroughly prospecting the area. Of particular importance is the proportion of **fines** (trommel undersize) the gravels contain because this proportion determines what volume of gold-bearing material will pan through the system. The percentage of oversize material (tailings) and undersize material should be determined by testing. Only then is it possible to determine the feed rates to the gold recovery section of the plant.

The throughput of many plants is limited by the capacity of the gold recovery devices, which is commonly lower than expected, particularly when relatively large percentages of fines are present.

In the operation of any gravity gold recovery system, it is important to ensure a continuous, uniform feed to the trommel. Because almost all operations are excavator-fed this will require care and concentration. It is also important that plant water is clean and contains as few slimes as possible. Efficient gold recovery with dirty water is impossible.

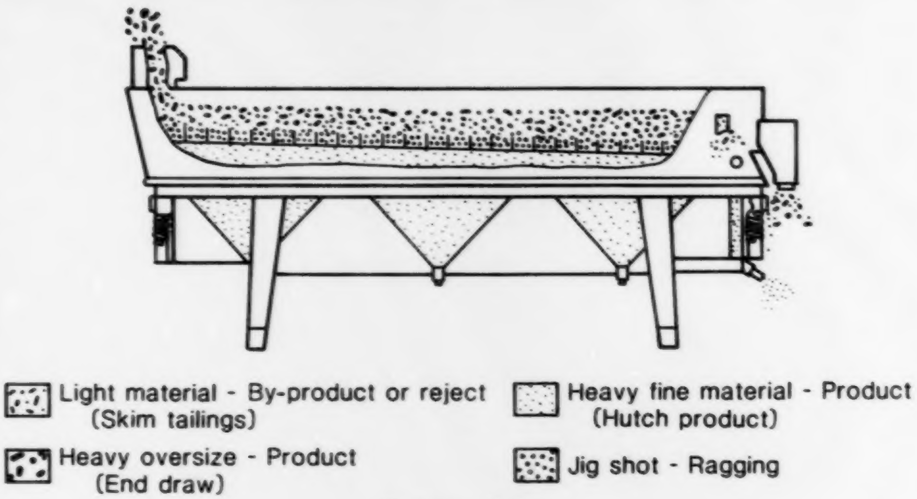
IMPROVING ALLUVIAL GOLD RECOVERIES

In assessing suitable cost-efficient alluvial gold recovery systems, the previous points must be considered. Given that the riffled table is metallurgically inefficient but has a low capital cost, it is important to consider what other methods of gold recovery are available at realistic costs. Most important of these are:

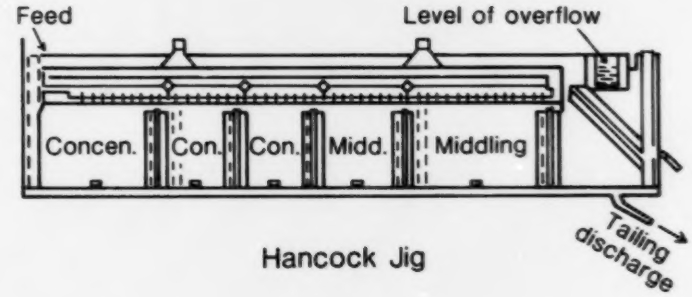
Jigs (Fig.4) These devices have long been used on gold dredges as a means of primary concentration and give substantially higher gold recoveries, particularly in the finer gold size fraction (below 0.5mm) than a riffled table. A jig essentially uses the high settling velocity (because of the high specific gravity) of gold in water. This high settling velocity is enhanced by creating pulses of water in the jig. The gold and other heavy minerals are then drawn through the jig bed and **ragging** (usually steel shot), and through the jig screen into the jig hutch. Jigs are normally either two or four cell units. A high grade concentrate is drawn off at the first cell and lower grade concentrates at subsequent cells.

The use of jigs as a means of concentrating gold does require more care and attention to the operating variables than a riffled table. Variables of particular importance are:
a) Feed rate.
b) Addition of water.
c) The number of jig cycles per minute.
d) The length of jig stroke.

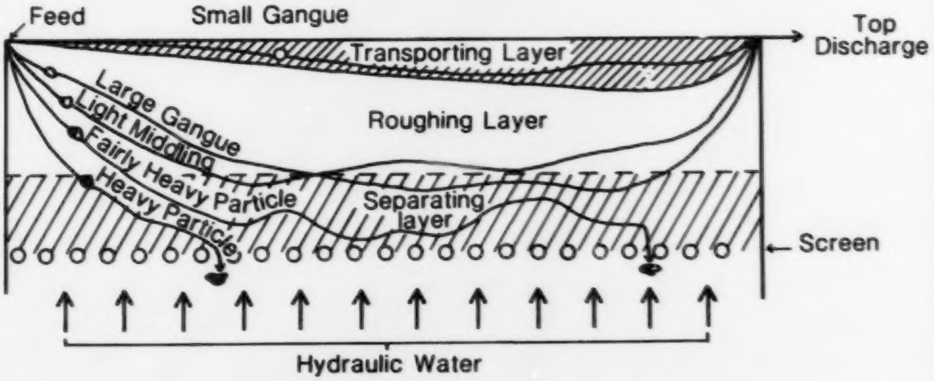
Centrifugal concentrator These devices are spinning bowls which the gold and other heavy minerals are retained behind ridges or bars in the bowl. Lighter tailings materials work their way up and out of the bowl. Essentially the recovery of gold is affected by enhancing the high specific gravity of the gold by means of centrifugal force in a fluidized bed of material. Recovery from these concentrates is controlled by:


Light material - By-product or reject (Skim tailings)
Heavy fine material - Product (Hutch product)
Heavy oversize - Product (End draw)
Jig shot - Ragging

Remer Jig

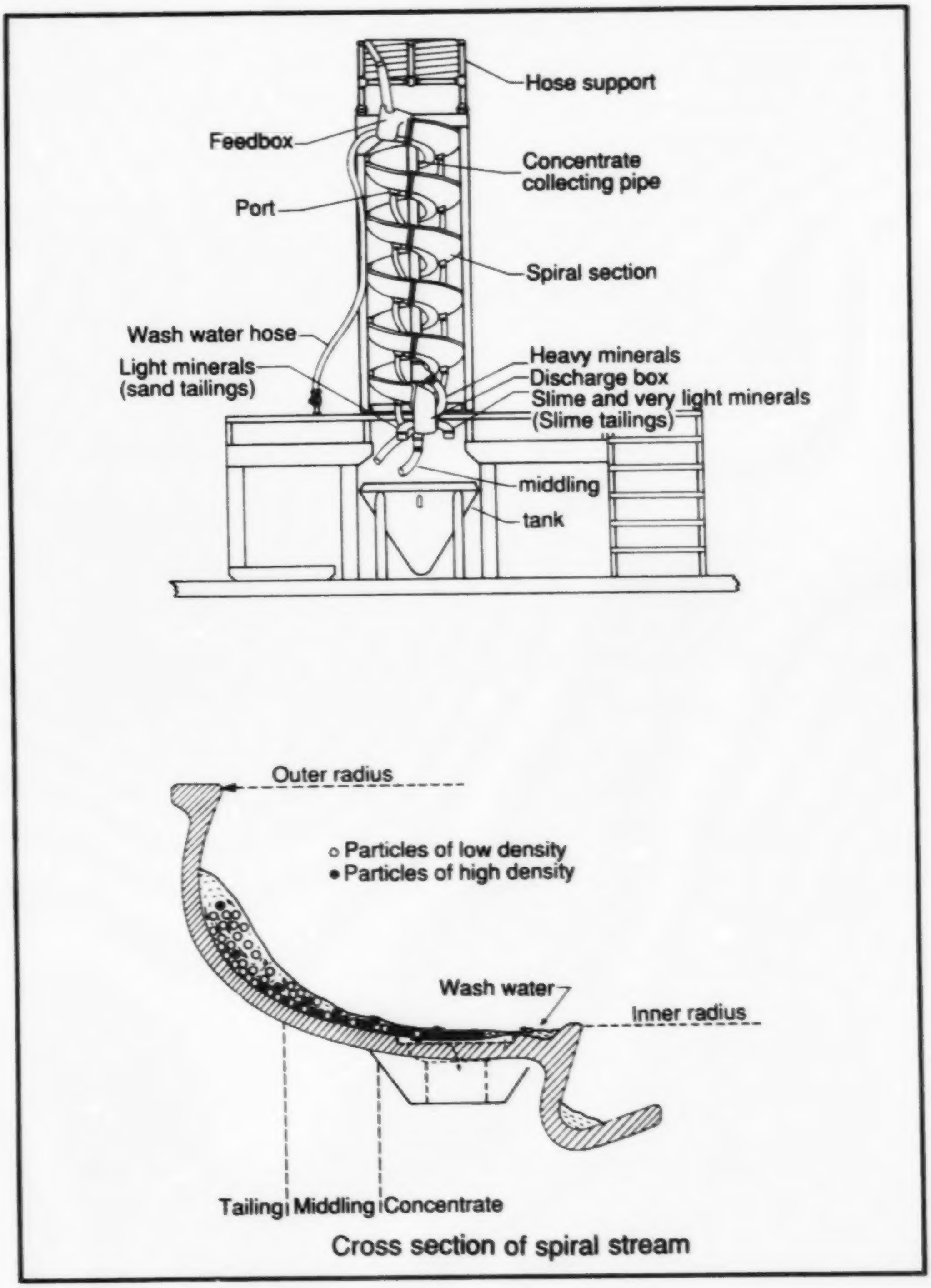

Feed
Level of overflow
Concen.
Con.
Con.
Midd.
Middling
Tailing discharge

Hancock Jig


Feed
Small Gangue
Top Discharge
Transporting Layer
Large Gangue
Light Middling
Fairly Heavy Particle
Heavy Particle
Roughing Layer
Separating layer
Screen
Hydraulic Water

Particle paths in jig

Figure 4: Jig operation (Pryor, 1965).



Hose support
Feedbox
Concentrate collecting pipe
Port
Spiral section
Wash water hose
Light minerals (sand tailings)
Heavy minerals
Discharge box
Slime and very light minerals (Slime tailings)
middling
tank
Outer radius
○ Particles of low density
● Particles of high density
Wash water
Inner radius
Tailing
Middling
Concentrate

Cross section of spiral stream

Figure 5: Spiral operation (Pryor, 1965).

a) The number of bowl revolutions per minute.
b) Water addition rate.
c) Feed rate.
d) Feed size (to be less than +2.0mm).

Spirals (Fig.5) These devices use a combination of gravity and centrifugal force. The slurry material enters the top of the spiral and a concentrate is removed from the pulp stream by splitters with variable settings. Spirals do, however, have several limitations which can substantially reduce the optimum recovery if not applied correctly. Factors affecting the operation of spirals are:
a) Feed size.
b) Feed rate (maximum 3 tonne solid per spiral/hour).
c) Pulp density (ration of solids to water).

IMPROVING PLAN DESIGNS FOR THE RECOVERY OF ALLUVIAL GOLD

Modification to existing plants Where it has been found by testing that eocnomically significant losses are being made from a riffled table plant, it might be possible to upgrade recovery by one or more of several means. These may involve something as simple as providing a clean plant water supply or introducing a stage of secondary concentration after the riffled table.

The cost effectiveness of any improvements proposed must, however, be carefully considered after suitable testing of plant efficiency and the nature of the gravels and gold. In some cases, improved metallurgical efficiency from extensive modifications to existing plant may be insufficient to cover higher capital and operating costs and may not be worthwhile, particularly where mine life is short.

Improvements to existing plant that can be undertaken cheaply and easily iclude:
a) Refinement of distribution systems to give uniform feed to tables.
b) Modification of boil boxes and riffles to achieve most efficient configuration.
c) Increasing table length and/or width.
d) Introduction of riffles or moulded rubber matting to tailings chutes.
e) Changing mesh aperture sizes to improve throughput of riffled tables.
f) Altering water supply to trommel and/or tables.

Alterations should be made one at a time and the effect of each change determined before further alterations are made, to ensure that the most efficient configuration of mesh size, water supply, feed distirbution and riffle type is achieved.

Where plant losses are high, treatment of the table tailings may be economically worthwhile. This would probably involve secondary screening and treatment by jig, centrifugal concentrator or spiral. In such cases it would probably be better to construct a new plant incorporating the recovery circuit in the main plant, provided sufficient reserves are present.

New plant If a new plant for the recovery of alluvial gold is being considered, all the possible factors that will affect gold recovery should be tested and reviewed. Unless the prospector is processing clean gravels (no clay or silt content) with only coarse gold present and using clean plant water, gold recovery methods other than a riffled table plant should be considered. An efficient plant could involve a trommel feeding to a four cell rougher jig (third and fourth cell used for scavenging). Jig concentrates would be fed to a two cell cleaner jig and the cleaner jig concentrate would then be fed to a centrifugal concentrator. Dewatering cycles and a slime concentrate would also be part of the overall circuit. During all of these steps, the operators would need to ensure the correct feed rates and the correct pulp density to each section in order to achieve optimum gold recovery.

Increasing numbers of gold recovery plants, which incorporate improved gold recovery circuits, are being constructed. These plants can significantly increase gold recoveries, and should be seriously considered for alluvial gold recovery on the West Coast of New Zealand, particularly where a relatively long mine life is assured.

SUCTION DREDGING

Suction dredging has only limited application for prospecting, its use being mainly confined to creek beds with shallow water and thin gravels.

Suction dredging at locations along a creek and its tributaries can be used to identify the extent of gold deposition in an area, and the location of the source of gold in the deposits. This type of reconnaissance sampling can also be undertaken by pan, although suction dredging allows larger volume samples to be taken and accordingly should give more representative results. Hand shovelling to a sluice box, where appropriate, would also give similarly reliable results to suction dredging.

When suction dredging is used as a prospecting tool, in order to determine the gold grade, it is important to measure the volume treated as accurately as possible and, where gold grades are not evenly distributed, to take as regular shaped pits as possible to avoid distortions in grade. In practice this is very difficult because of water flows and slumping of the generally loose creek bed gravels, and in most instances only semi-quantitative data can be obtained, giving a guide to, rather than measurement, of grades present.

If suction dredging is used during the early stages of prospecting, and encouraging results are obtained, follow-up sampling by drilling, pitting or trenching as appropriate should be undertaken to more accurately determine depths and grades prior to mining.

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Turn of the Century Recovery Systems

SELECTED EXCERPTS FROM
PLACER GOLD RECOVERY RESEARCH

By

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The primary objectives of the Gold Recovery Project are to evaluate gold losses with statistically based sampling programs, determine how to improve gold recovery, assist miners with the recommended technology, and make this information available to the entire placer industry.

An additional objective of the 1990 research program is the development of nuclear tracing technology as a cost-effective method of determining gold losses.

PLACER GOLD RECOVERY RESEARCH FINAL SUMMARY

1 GOLD RECOVERY TESTING PROCEDURES

1.1 SOME COMMON GOLD RECOVERY MISCONCEPTIONS

Testing sluiceboxes with conventional sampling is very costly, time consuming, and problematic. Some miners, geologists and engineers have tried to determine the relative recovery efficiency of a sluicebox with the following indicators which are erroneous and misleading:

a) PRESENCE OF FINE GOLD - The presence or absence of fine gold in a sluicebox is not a valid recovery test because even the crudest sluicebox will recover some proportion of the fine gold present in a placer deposit;

b) PRESENCE OF NUGGETS - The presence or absence of nuggets is not a valid recovery test because some of the coarse (+1 mm) gold particles are recovered in even the finest expanded metal riffles. Expanded metal mesh is more efficient at recovering gold finer than 1 mm, however it may lose up to 70% of the gold coarser than 5 mm (Clarkson 1989);

c) INITIAL CONCENTRATION - A high concentration of gold in the first few feet of sluice run is not a good indicator of recovery efficiency. Tracer tests revealed that sluiceboxes with overall recoveries of less than 30% still had most of the recovered gold in the first few feet of the sluice run;

d) TRIAL AND ERROR TESTS - False conclusions will result when estimates of the efficiency of sluicebox modifications are based on the quantity of gold recovered. This is due to the wide variations in the size distribution and quantities of gold present in different areas of a placer deposit;

e) GOLD PAN SAMPLES - A gold pan is a very small sample and prone to the "nugget" or coarse gold particle effect. Tailings piles are particularly difficult to sample due to gold segregation;

f) COMMON USAGE - Conventional sampling and radiotracer technology have indicated that many popular sluicebox designs and operating procedures are very wasteful. Often the long term survival of gold recovery devices has very little to do with their recovery efficiency;

g) LONG TERM SURVIVAL - The long term survival of a placer gold mine is dependent on many factors. Operators with high grade gold deposits will survive even if they employ poor recovery and mining practices;

h) YOU CAN'T GET IT ALL - It is generally considered impossible to recover all of the gold in a placer deposit, however that does not mean that an operator should be content with the amount of gold he is currently losing. Minor modifications doubled the overall recovery at mine H and increased its profitability dramatically.

1.2 CONVENTIONAL SAMPLING

In 1988, Clarkson conducted a detailed tailings sampling program (Clarkson 1990) at six operating placer mines. He collected hundreds of tailings sample increments in duplicate from across the full width of each sluicebox discharge over a two to four day mining period. The entire volumes (2 to 7 cubic yards each) were screened and processed several times on a shaking table to determine gold losses. Despite the large size, numerous increments, and extreme care taken in the design and implementation of the program, the standard errors ranged from a low of 8% to unacceptable values as high as 50% when high and/or coarse gold losses were encountered.

Testing sluiceboxes with conventional sampling and evaluation techniques is very costly, time consuming, and problematic. Most placer gold ores are of very low value and contain a very small number of gold particles in a large volume of pay gravels. Sluiceboxes lose coarse gold particles and the presence or absence of one of these in a tailings sample can lead to high unpredictable errors (nugget effect). The collection of head samples is even more impractical than tailings samples due to the more frequent occurrence of coarse gold particles.

Every time conventional samples are upgraded, additional errors are introduced due to the inefficiency of recovery equipment. Significant losses are often discovered several months after testing, when it is too late for modifications and more tests in the same season.

1.3 NUCLEAR TRACERS

In 1989 and 1990 Clarkson conducted 30 radiotracer tests at 24 placer mines. For each test, 100 placer gold particles from four size ranges (1.4, 0.73, 0.36 and 0.18 mm or +14 to +100 mesh) were irradiated in a nuclear reactor. These tracers were thoroughly mixed with pay gravels and salted into the sluicebox's feed hopper 12 to 24 hours before clean-up. At clean-up, scintillometers were used to detect the very low level X-ray and gamma ray radiation emitted by these tracers to locate them in the sluice runs.

At every mine the gravel feed rates, water flows, equipment dimensions and riffle performance were measured. After the gold tracers were removed from the final concentrate and counted, the concentrate was sieved and weighed. These gold recovery, weight and sieve data were used to calculate the quantities and size distributions of the gold particles in the original pay gravels and those lost in the tailings. The expired tracers were stored in a lead line container until their radioactivity was near background levels (about 2 months).

The standard errors from these radiotracer tests were estimated from binomial probability theory. Each overall recovery estimate would be within one standard error of the true recovery value 14 times out of 20. The maximum standard error with 100 tracers was 5% and occurs when the recovery approached 50%. With higher recoveries, standard errors usually ranged from 2 to 3%.

Nuclear tracers have increased the scope and safety for the field testing of sluiceboxes while reducing errors, costs and evaluation times dramatically. When tracers are used, it is not necessary to take continuous tailings samples from the sluicebox's discharge while dodging boulders and heavy equipment. The gold tracers are irradiated to extremely low levels and create personal exposure levels several times lower than nuclear industry standards.

Each 1990 radiotracer test was only 10% of the cost of a conventional tailings ampling test carried out in 1988. With nuclear tracers, no assaying or upgrading is required, tests can be completed in 48 hours and this allows sluiceboxes to be modified and retested in the same week. Tracers can be used outdoors and in dirty gold rooms without introducing errors or concerns about tampering. The tracers can be readily identified with a scintillometer and are available only to licensed agents.

1.4 LABORATORY ANALYSIS OF RIFFLE PERFORMANCE

During the winter of 1989/90, a pilot scale testing facility was constructed at the Yukon College in Whitehorse. It used a gravel pump and cyclone to continuously cycle ½ inch placer gravels through an 8 foot by 6 inch wide sluice run. The sluice run was constructed with Plexiglas sides to allow visual interpretation. Several sizes, types, spacings and orientations of riffles were tested under a variety of feed rates, water rates and sluice run slopes to determine the optimum scour and deposition patterns.

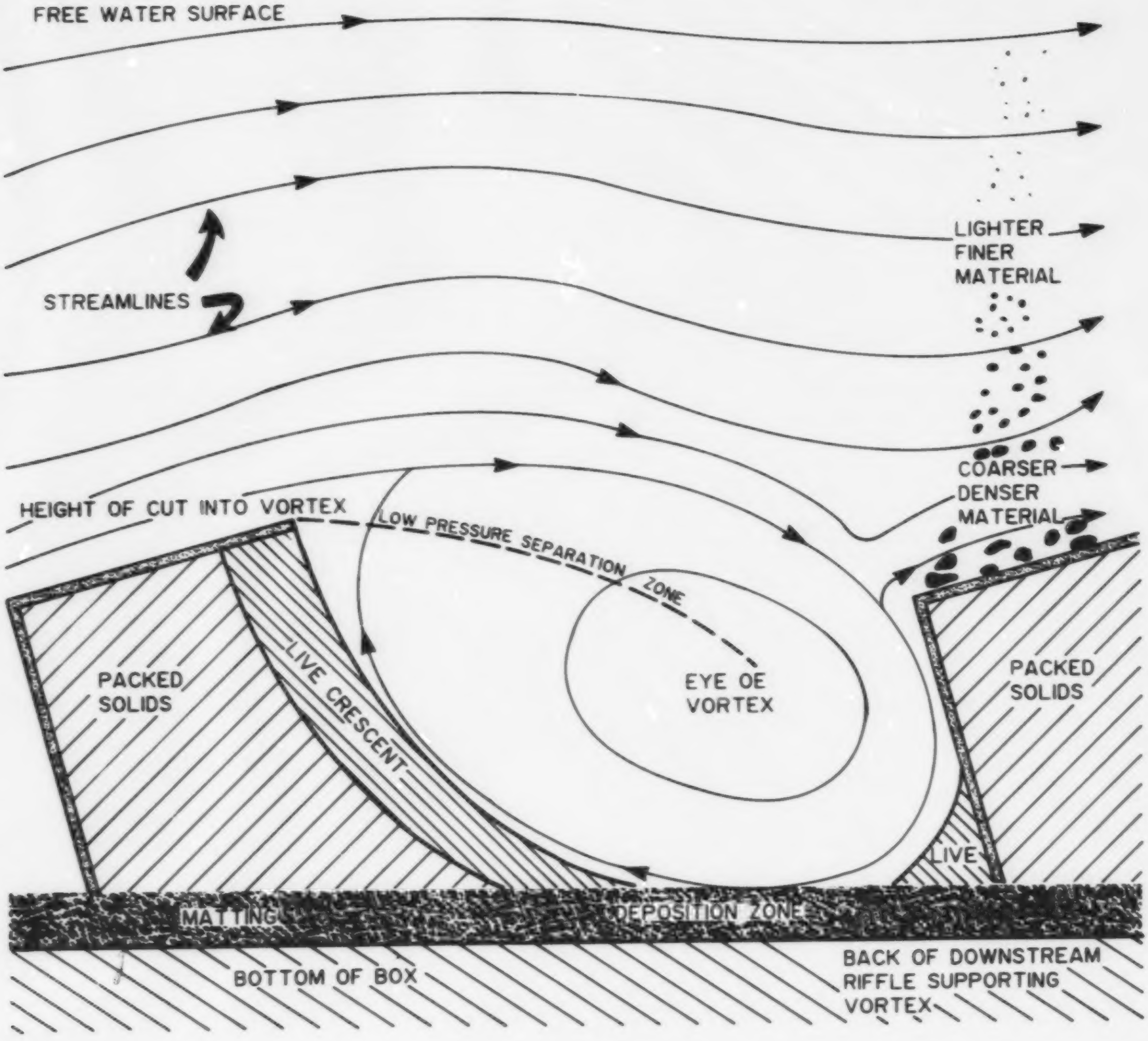
Once the optimum conditions had been observed, the feed was salted with irradiated gold particles to confirm the riffle's effectiveness. In addition, the effects of Monsanto matting, suspended punch plate and the screening efficiency of stationary punch plate were also investigated.

2 DISCUSSION

2.1 PLACER MINING

Yukon placer mines rely on the excavation and processing of relatively large volumes (60 to 250 cubic yards per hour) of low grade material. This is usually done with diesel powered earth moving equipment such as tracked dozers, rubber tired loaders, backhoes and scrapers. Most placer mining areas in the Yukon are in continuous permafrost and the barren overburden and /or organic "black muck" must be stripped off with bulldozers and the ground left to thaw before mining can commence. Stripping is often started as early as March and can continue into November, but the period of frost free weather available for sluicing placer gravels is often as little as 100 days.

Figure 1: Detailed Cross Section of Recovery Mechanism


FREE WATER SURFACE
STREAMLINES
LIGHTER
FINER
MATERIAL
COARSER
DENSER
MATERIAL
HEIGHT OF CUT INTO VORTEX
LOW PRESSURE SEPARATION ZONE
PACKED
SOLIDS
LIVE CRESCENT
EYE OE
VORTEX
PACKED
SOLIDS
LIVE
MATTING
DEPOSITION ZONE
BOTTOM OF BOX
BACK OF DOWNSTREAM
RIFFLE SUPPORTING
VORTEX

The energy of this vortex is derived from the velocity of the slurry above the riffle and is slowly reduced due to friction as it flows down the back of the riffle, across the matting and up the live sorting crescent in its oval path. The gold contained in the streamline is driven by centrifugal force to the outside of the vortex. At the bottom of the vortex, centrifugal and gravitational forces combine to drive the gold particles into (or through) the matting.

2.2 THE SLUICEBOX

The sluicebox has been used for the recovery of placer gold since ancient Greece (Jason's golden fleece) and it is still the most important placer gold concentrator in the Yukon. Sluiceboxes provide a much higher concentration ratio than most other gravity concentrators such as jigs and spirals. Sluices are also very reliable, inexpensive and simple to operate.

A sluicebox is a rectangular flume containing riffles through which a dilute slurry of water and alluvial gravel flows. The most common sluice riffles include expanded metal, angle iron (Hungarian) and flat bar. Matting is usually placed under the riffles to help retain the gold particles. To remove the gold concentrates, sluiceboxes are shut down and the riffles and matting are taken apart and cleaned.

2.3 GOLD RECOVERY MECHANISM

Previous researchers disagreed on the exact mechanism of gold recovery in a sluicebox but most related it to settling velocity (Peterson, MacDonald). Sluiceboxes are actually centrifugal concentrators and settling velocity plays a minor role in the gold recovery mechanism of a riffle. Gold's greater settling velocity allows a gold particle to descend to the bottom of the slurry column where it is preferentially cut into the streamline feeding a riffle's vortex (**figure 1**).

As the segregated slurry flow approaches the open space between the riffles it encounters a low pressure zone which draws a ribbon of the slurry column down into the riffle. Under ideal conditions, this ribbon of slurry will be overturned as it flows down the rear of the following riffle and will continue flowing in a circular path to form a vortex.

If a gold particle cannot enter the matting it continues to a crescent of loose gravels which are continually being sorted by the reduced upward velocity of the vortex. Lighter weight particles continue flowing up and along the surface of this crescent and are ejected into the slurry flow above the vortex. Gold and heavier minerals which were not previously driven into the matting tend to remain near the bottom and inside of this sorting crescent.

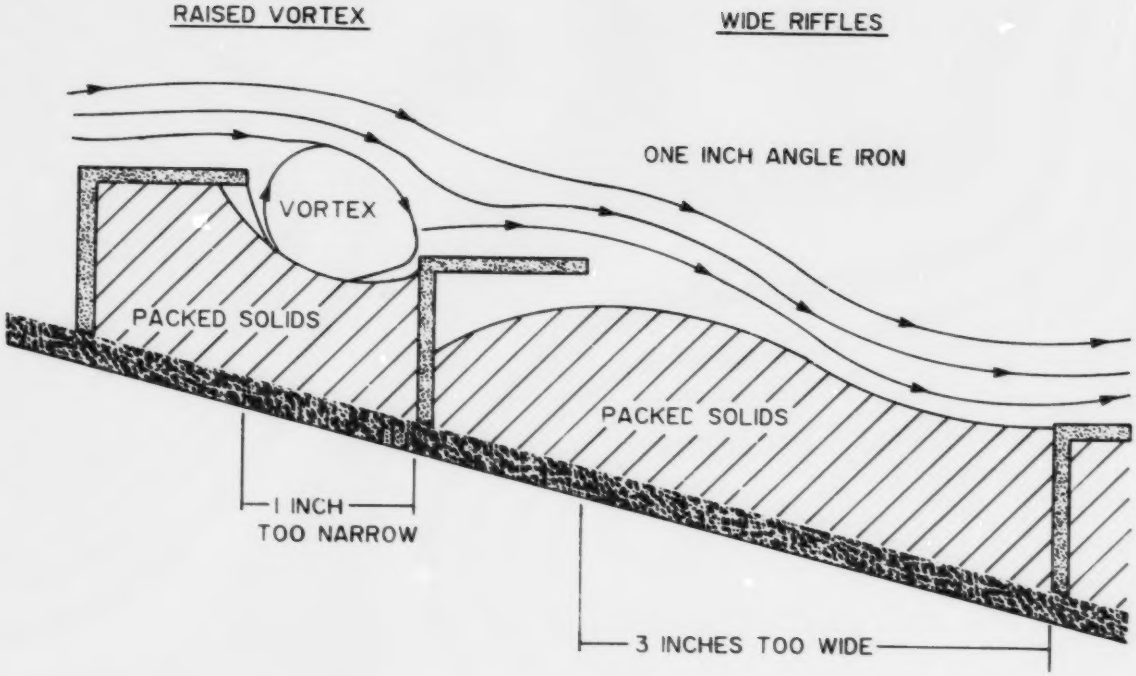
When a sluicebox is shut down the sorting crescent slumps into the area previously occupied by the vortex. This material is very well washed, loose and composed of heavier minerals. The volume under the riffle's horizontal lip which is not occupied by the vortex and sorting crescent is comprised of packed mineral particles which rarely contain gold. Gold particles are usually unable to penetrate into the packed solids under a riffle or under a raised vortex.

The slurry velocity provides the energy which powers the vortex. If the velocity of the slurry is reduced through overloading with solids, insufficient water flow or shallow gradients it may not sustain a vortex. If the riffles are too close, too far apart, too tall, or if there is not enough energy available to the vortex, the vortex will not be formed properly.

2.4 RIFFLE SPACING

If the riffles are located too close, there is not a long enough contact between the slurry flow and the vortex to transfer the required energy. under these conditions, the backside of the downstream riffle will begin to collect material and the bottom of the vortex will rise off the mat and isolate the gold concentrating vortex from the matting (**figure 2**). When the riffles are spaced too far apart, the streamline which is drawn down into the riffle is not overturned and continues up and over the back of the next riffle. Under these conditions the space between the riffles fills up to form a shallow depression. Gold which is deposited in this depression is very sensitive to loss from scouring (**figure 3**).

Figure 2: Raised Vortex **Figure 3: Wide Riffles**



In a typical sluicing environment the maximum sized vortex which can be sustained is approximately one inch in diameter. If the riffles are taller than one inch, then the vortex will readily rise off the mat and pack the riffles with material.

The energy of this vortex is derived from the velocity of the slurry above the riffle and is slowly reduced due to friction as it flows down the back of the riffle, across the matting and up the live sorting crescent in its oval path. The gold contained in the streamline is driven by centrifugal force to the outside of the vortex. At the bottom of the vortex, centrifugal and gravitational forces combine to drive the gold particles into (or through) the matting.

2.5 RECOMMENDED FEED RATES

Poling recommended pay gravel feed rates of 8 loose cubic yards/hr and water flow rates at 160 Igpm per foot of sluice width. Field experience in 1989 and 1990 indicates that this feed rate should not be exceeded for expanded metal riffles but can be doubled for angle iron riffles. Water flow rates were less critical and could range from a minimum value of 160 Igpm/foot (angle iron riffles require at least 320 Igpm/foot) and can be increased up to 2.5 times without gold loss.

Pay gravel feed rates which exceed 100% of recommended values are one of the greatest factors contributing to gold losses. Pay gravel feed rates below 100% of recommended values may improve gold recovery slightly.

2.6 ANGLE IRON RIFFLES

Clarkson recommended the use of angle iron riffles to retain gold particles coarser than 1mm (14 mesh) and expanded metal riffles to retain gold finer than 1mm (Clarkson 1989). Angle iron riffles required much steeper slopes (3 inches/ft), higher water flow rates (at least 320 Igpm per foot of width) and can tolerate higher feed rates (16 loose cubic yards/ft of sluice width) than expanded metal riffles. Modified one inch angle iron riffles (top leg reduced from 1 to ½ inch in length) and ordinary one inch angle iron riffles were the most consistently efficient coarse riffles. The modified riffle had a much smaller deposit of packed gravels and therefore higher proportion of clear matting because of its shorter top leg (**figure** 4).

Regular or modified angle iron riffles should have a two inch gap and be tilted at 15 degrees upstream of the sluicebox's vertical in a sluice run with a slope of 3 inches/foot. The riffles have better performance at this steep slope because the increased slurry velocity provides more energy for the vortex. The efficiency of the vertically aligned riffles is slightly lower.

2.7 FLAT BAR RIFFLES

Flat bar riffles are not recommended for the recovery of gold particles smaller than 2.4mm (8 mesh) because they create excessive turbulence and reduce the vertical segregation of gold particles. The material rejected by a flat bar's vortex is launched up to the top of a turbulent slurry column instead of on to the next riffle. This severely reduces the opportunity for gravels and anything except very coarse gold nuggets to enter the riffles. Flat bar riffles may be suitable for a coarse (+½ inch) nugget trap, however more research would be required to confirm this application.

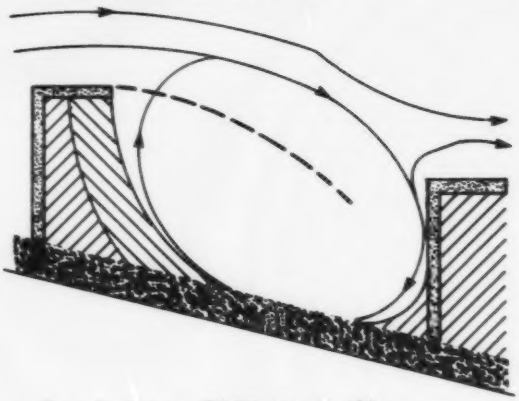
2.8 EXPANDED METAL RIFFLES

Expanded metal riffles are recommended (Clarkson 1989) to retain gold particles finer than 1mm (14 mesh). Expanded metal riffles create vortices similar to those in the angle iron riffles but they cut a shorter height of the slurry column into their vortices (**figure 5**). Due to its small size and shallow live sorting crescent, the expanded metal riffle is very sensitive to changes in slurry density such as those caused by surging.

Figure 4

MODIFIED ANGLE IRON RIFFLES

MODIFIED 1/2 INCH LIP

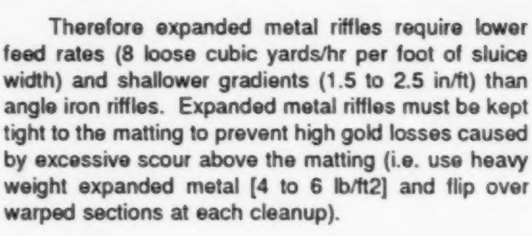


Two inch gap, 3"/ft slope -15° tilt, one inch Tall.
Note: Reduction in packed solids volume over Angle Iron Riffles.

Figure 5

EXPANDED METAL RIFFLES

4 lbs /ft^2 HEAVY METAL GRATING



Therefore expanded metal riffles require lower feed rates (8 loose cubic yards/hr per foot of sluice width) and shallower gradients (1.5 to 2.5 in/ft) than angle iron riffles. Expanded metal riffles must be kept tight to the matting to prevent high gold losses caused by excessive scour above the matting (i.e. use heavy weight expanded metal [4 to 6 lb/ft2] and flip over warped sections at each cleanup).

Doubled expanded metal riffles are not recommended because the bottom layer of expanded metal fills up and hardens with use. This prevents the gold particles from penetrating into the matting and makes the riffles even more sensitive to surging than single expanded metal riffles. When the doubled sections were separated with a 3/8 inch bar, the space eventually became clogged with gravels or they created erratic hydraulic patterns which lowered recovery.

2.9 MATTING

Unbacked Nomad matting appears to be the best matting in common use because it does not interfere with vortex formation, most of its volume is available for gold storage, it does not release entrained gold particles in a sluicebox and it is easy to clean. Cocoa matting and Astro Turf are not recommended because of their limited storage capacity and difficulty in cleaning. Monsanto matting is not recommended because its bottom sections pack hard and its long needles protrude between the expanded metal riffles and disrupt the formation of regular large vortices.

2.10 OSCILLATING SLUICEBOXES

Pay gravels containing a high proportion of high specific gravity minerals such as magnetite, or a high percentage of clay are susceptible to riffle packing. Extreme gold losses occur when a sluice's riffles become packed because the gold is unable to get through to the matting. For these deposits, oscillating sluiceboxes may be advisable alternatives.

An oscillating sluicebox consists of a pair of sluice runs suspended from a frame with cables. A direct current electric motor is mounted between and above the sluice runs and rotates a weighted bent shaft through an angle drive. The motor-drive combination creates a horizontal circular "panning" motion with a 5/8 inch diameter circle oscillated at 130 to 180 rpm. Oscillating sluiceboxes should not be used for pay gravels which don't have a tendency to pack riffles because conventional sluiceboxes have higher gold recoveries when processing normal pay gravels.

2.11 HYDRAULIC RIFFLES

Hydraulic riffles have recently been introduced into the Yukon from New Zealand. These riffles consist of alternating two inch flat bar riffles and one inch square tubing perorated on the bottom. Low pressure water is introduced into the square tubing from a manifold on the side. The pressure of the water must be controlled so that it keeps the riffles loose but does not eject fine gold particles (about 10 psi). Even with a screened water intake, the manifolds and tubing must be cleaned periodically to ensure that water flows evenly throughout the riffles.

At mine Y, gold recovery was relatively high. Its hydraulic riffles operated with feed rates and water flows at less than half of recommended values for conventional riffles. The riffles remained full and relied on settling velocity to lower gold particles through the low velocity water flows into the loose bed of material. Its hydraulic riffles did not develop the scouring vortices common to conventional riffles and therefore required a trommel scrubber unit to ensure that gold particles were washed free of clays and other waste minerals. Matting was not used and was probably unnecessary due to the absence of turbulence in the tall riffles.

Mine V used a trommel screen but had very low gold recovery with hydraulic riffles. This low recovery occurred even though its feed and water addition rates were at recommended values (for conventional riffles) and the riffles remained loose. This extreme variability in gold recovery for two very similar systems indicate the need for detailed testing to determine the optimum operating parameters for this type of riffle.

2.12 PUNCH PLATE

Stationary punch plate is not recommended because it is a very inefficient screen and it reduces the velocity of the slurry above the riffles. Its efficiency is even lower at steeper (3 in/ft) slopes and/or high slurry velocities. Sections of punch plate shorter than two feet (in common use) are almost completely useless.

If punch plate is too close to riffles, the slurry velocity becomes too slow to power a vortex and the riffles will fill and pack. Riffles located below punch plate are much more sensitive to changes in slurry velocity and once filled (i.e. due to surging), take a long time to clear. It is impossible to check how well the riffles are operating when they are located below punch plate.

2.13 TRIPLE-RUN SLUICEBOXES

Several large Yukon placer operations use triple-run sluiceboxes consisting of some combination of a slick plate, dump box recovery area, distributor, center run, undercurrent run and side runs (**figure 6**). The slick plates are mixing areas where the pay gravels are washed with either stationary or manually operated water monitors. Manually operated monitors provide better washing and help control surges of pay gravels.

Triple-run sluiceboxes rely on the ability of their distributor's stationary punch plate to screen and distribute fine pay gravels to the side runs. Most of the water entering the distributor has to stay above the punch plate to push large rocks along. Fine pay gravels and gold are inevitably trapped in these turbulent excessive water flows (300% to 600% of recommended values) and are swept down the center run with the boulders at high speed (10 to 17 ft/s).

Distributors are often too small (less than 100 ft^2), are fitted with punch plates with small holes (less than 3/4 in) and pass the slurry over at very high velocities. These distributors are often so inefficient that they reduce gold recovery by underutilizing the side runs (7-70% of recommended values) and overloading the center run with boulders and fine pay gravels (300-700% of recommended values). Additional gold losses occur in the center runs when rocks are wedged between the riffles and disrupt proper vortex formation in the riffles.

The short sections of punch plate which are installed in some center runs to direct fine gravels to an undercurrent run are even less effective. The center runs have to be completely dismantled before an undercurrent can be cleaned, and consequently are not cleaned as often as they should be. It is also impossible to observe the riffle action and adjust the slope of an undercurrent run.

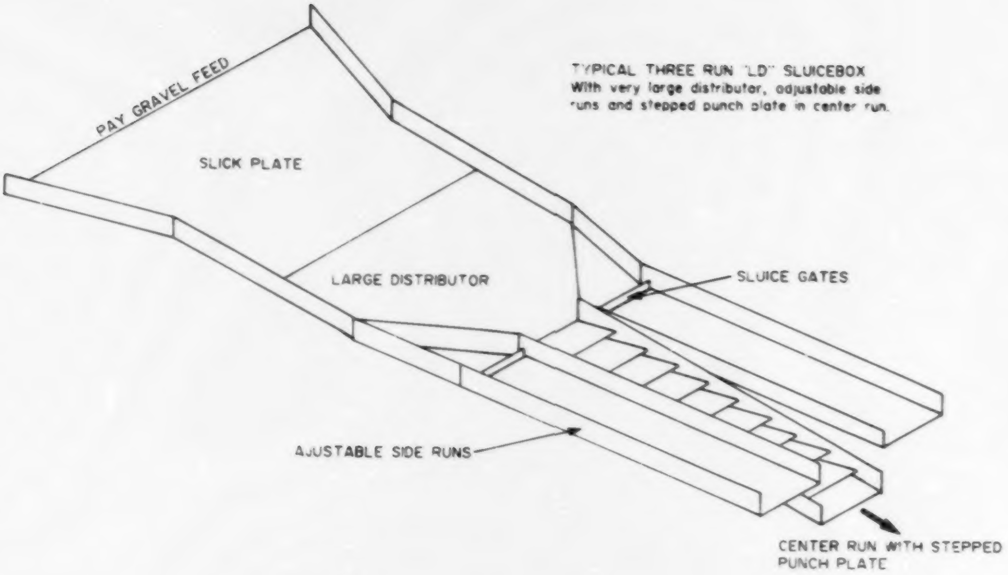
Some mines (M, O, P, Q, 090, W and X) improved their gold recovery significantly by installing riffles under punch plate in the dump box area in front of their inefficient distributors. At mines O,P,Q,W and X dump box's undersize gravels were not distributed to the side runs but were discharged back on top of the distributor to be screened once again. The heavy sections of punch plate above the riffles in a dump box had to be raised before its riffles and matting could be cleaned.

The mines using the Ross Box (mines K, O, P, 909, W and X) had their side runs fixed at the same steep slopes as the center run, underflow and dump box recovery area. The operators attempted to control pay gravel and process water flows to the side runs by blocking or opening holes in the punch plate distributor. It was virtually impossible to control the allocation of water and pay gravels to the various runs if the gravel sizes changed with depth or from pit to pit.

In a Pearson Rock Box (mine U) and the homemade "LD" boxes (large distributor, mines H, I, L and T), the allocation of water to the various runs was more easily controlled with sluice gates located at the distributor's discharge. These mines also were able to adjust their side run slopes to optimize riffle performance. The "LD" boxes also had a much larger punch plate distributor and a manned wash monitor. This combination resulted in more efficient screening and helped to control pay gravel surging.

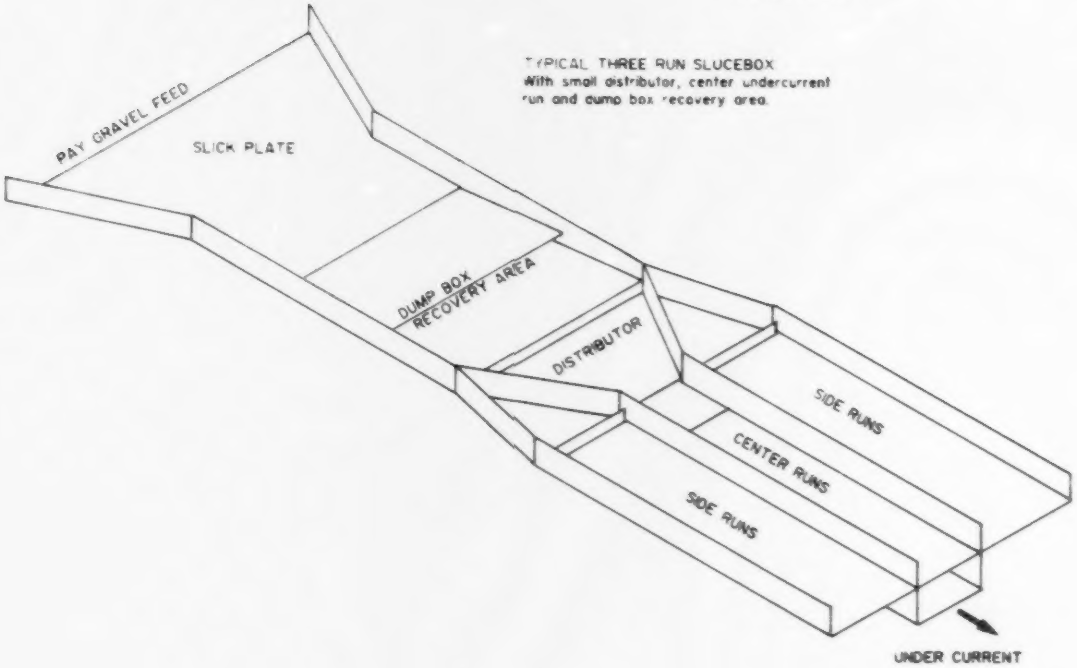
The other homemade triple-run sluiceboxes had features from both the Ross and Pearson sluiceboxes. The homemade sluicebox at mine M had a stationary four inch grizzly, a large dump box gold recovery area and side runs with fixed slopes. Mine Q's homemade sluicebox had a gold recovery area in the dump box and adjustable side runs.

Figure 6: Components of a Triple-run Sluicebox



TYPICAL THREE RUN "LD" SLUICEBOX
With very large distributor, adjustable side runs and stepped punch plate in center run.

PAY GRAVEL FEED
SLICK PLATE
LARGE DISTRIBUTOR
SLUICE GATES
AJUSTABLE SIDE RUNS
CENTER RUN WITH STEPPED PUNCH PLATE



TYPICAL THREE RUN SLUCEBOX
With small distributor, center undercurrent run and dump box recovery area.

PAY GRAVEL FEED
SLICK PLATE
DUMP BOX RECOVERY AREA
DISTRIBUTOR
SIDE RUNS
CENTER RUNS
SIDE RUNS
UNDER CURRENT

2.14 PRE-SCREENING

When pay gravels are screened before sluicing, gold recovery is improved dramatically, much less water is required for sluicing, barren gravels are eliminated from the sluicebox feed and riffle wear is significantly reduced. Pre-screening eliminates the need for a triple-run box and the corresponding problems in allocating fine gravels and water to the various sluice runs.

Screens also improve washing by breaking up clumps of clay and cemented particles. Inadequate washing is a very common cause of gold losses. When triple-run boxes are replaced with pre-screened sluiceboxes constructed in accordance with the capital costs are usually recovered within the first mining season and often in a few weeks of operation. (Section 3 is included at the end of this paper.)

The derocker is a well known and reliable moving deck grizzly-feeder which does a good job of washing and rejecting coarse boulders. It can be fed with a dozer provided that additional wings are added to its entrance. Its main limitation is its feed rate (generally less than 150 loose cubic yards/hour) and its coarse undersize (2.5 inch).

Trommel screens are very good at scrubbing pay gravels but can be large and relatively inefficient screening devices. The feed rate must be controlled with a manned monitor or by short feeding cycle times. Larger boulders must be sorted out of the feed to reduce impact damage. The long gradient required of a trommel screen also requires high feed ramps.

A vibrating screen has a higher throughput, lower height requirements and lower capital costs than a trommel. Two or three decks can be stacked on top of each other and result in very efficient, high volume screening. Very large boulders should be sorted from the feed or moved by stationary grizzlies constructed above a hopper. Mine Q90 constructed a very efficient, high volume, portable sluicebox which is fed directly with a bulldozer. This prototype could be fitted with a vibrating screen deck.

Super Sluice finger grizzly-feeders are not recommended for high volume applications due to their low throughput (100 loose cubic yards/hour) and the extensive down time experienced at mine Q90. The design of the hydraulic controls and the layout of the grizzly bars required extensive modifications at mine Q90. Other mines with lower throughputs have reported low operating costs and satisfactory service with a Super Sluice.

3 STANDARD RECOMMENDATIONS

The highest percentage gold recoveries occurred at mines which screened their feed to minus one inch, used both expanded metal and angle iron riffles on top of nomad matting for every sluice run and fed their runs at recommended feed and water rates. Expanded metal riffles are efficient at recovering placer gold particles finer than 1mm while angle iron riffles are more efficient at recovering those greater than 1mm. Slick plates allow gold particles to segregate to the bottom of the pay gravel slurry where they are more readily available for recovery by the riffles.

Pilot scale and field testwork (Clarkson 1989 and 1990) has indicated that sluice runs should be designed and operated at the following specifications for optimum recovery levels:

a) Pay gravels should be prescreened to at least minus one inch, washed thoroughly prior to sluicing and feed rates should be controlled with mechanical feeders, vibrating screen decks or manually operated with monitors;

b) Every sluice run should have a sixteen foot long section of coarse expanded metal riffles (4-6 lbs/ft^2) at which is wide enough to process 8 loose cubic yards/hr/ft with at least 160 Igpm of process water per foot of sluice width. The riffles must be tight against the nomad matting to prevent scouring between the riffles and the matting;

c) Optimum slopes for the expanded metal riffles section will range from 1.5 to 2.5 inches/foot and should be set at a slope at which they do not pack and do deposit a crescent of heavy minerals and gold directly downstream of each individual riffle (loose gravels may partially fill the rest of the riffle);

d) The expanded metal section of the sluicebox should be followed or preceded by a narrower eight foot length of sluice run fitted with one inch angle iron riffles at a steeper gradient of 3 inches/foot to avoid packing. At least 360 Igpm of slurry per foot of sluice width is required to operate the angle iron riffles. Try to reduce or avoid rooster tails by gradually narrowing runs or by using baffles;

e) The one inch angle iron riffles should be aligned at 15 degrees from the sluicebox's vertical towards the top of the box, located with a gap of 2 inches between each riffle and mounted tightly on top of nomad matting;

f) Riffles and matting must be easily removed so that more frequent cleanups (every 24 hours) will be performed (tracers which are not retained in matting will move down the sluice run, especially during start up periods); and

h) A section of slick plate at least four feet long should be placed in front of riffle sections to allow gold segregation in the slurry.

Mines A, G2, J and K90 demonstrated that a sluicebox can recover almost all of the placer gold in a Klondike deposit when feed control, adequate washing and fine (-3/4 inch) screening are provided to a sluicebox. Mines G2 and B also illustrated that an oscillating sluicebox was a reasonably efficient gold recovery device for fine pay gravels which tend to pack the riffles of conventional sluiceboxes.

The washability of pay gravels and the size distributions of placer gold particles should be determined before deciding on the type of gold recovery equipment to be used. Once the equipment is in operation, periodic tests should be conducted to detect the extent and causes of gold losses.

Additional field testing of existing placer operations should be conducted to expand the knowledge of gold recovery at a greater variety of deposit types and recovery equipment such as hydraualic riffles.

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